US 20190187859A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2019/0187859 A1

Friedman et al. (43) Pub. Date: Jun. 20, 2019

(54) **HAPTIC INTERACTION**

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(21) Appl. No.: **15/842,872**

(22) Filed: **Dec. 14, 2017**

Publication Classification

(51) **Int. Cl.**

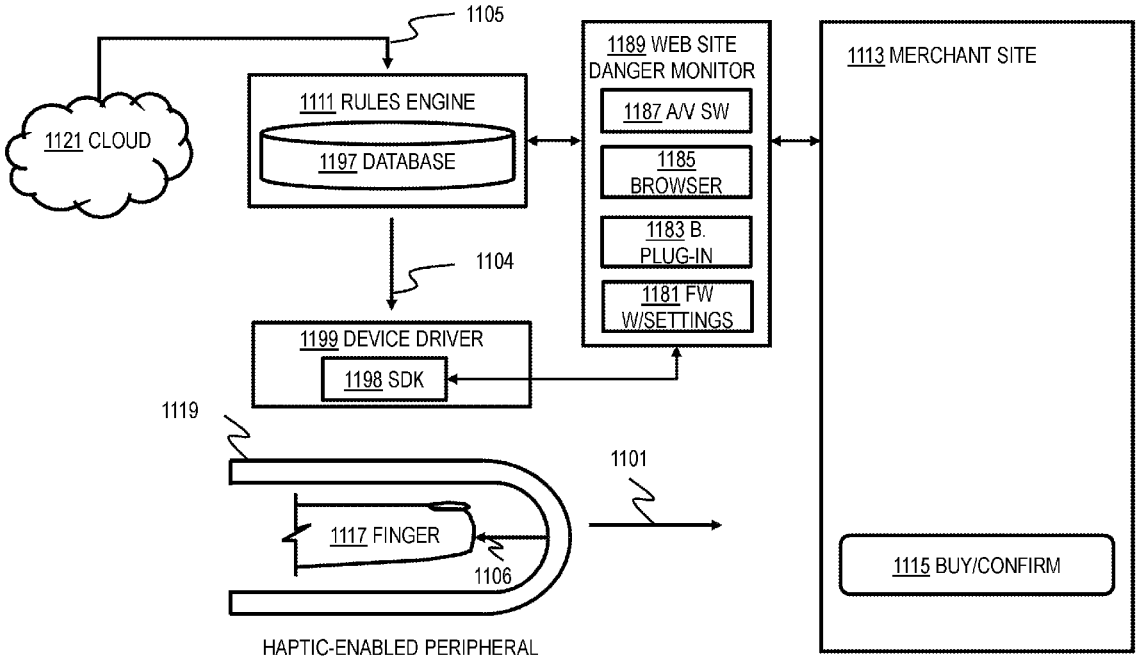
G06F 3/0481	(2006.01)
G06F 3/01	(2006.01)
G06F 3/0488	(2006.01)
G06Q 30/06	(2006.01)
G06Q 20/40	(2006.01)
G06Q 20/34	(2006.01)
G06N 99/00	(2006.01)

(52) **U.S. Cl.**

CPC ***G06F 3/0481*** (2013.01); ***G06F 3/014*** (2013.01); ***G06F 3/016*** (2013.01); ***G06F 3/0488*** (2013.01); *H04L 63/1408* (2013.01); ***G06Q 20/401*** (2013.01); ***G06Q 20/405*** (2013.01); ***G06Q 20/34*** (2013.01); ***G06N 99/005*** (2013.01); ***G06Q 30/0641*** (2013.01)

(57) **ABSTRACT**

A web site map of an external site, including information permitting determination of at least one pertinent location on the site, is obtained at a rules engine. At least one rule specifying peripheral behavior in a region adjacent the at least one pertinent location on the site is also obtained at the engine. Furthermore, an indication that a peripheral device corresponding to the at least one rule is being used to browse the site is also obtained at the engine. Instructions corresponding to the at least one rule specifying the peripheral behavior in the region adjacent the at least one pertinent location on the site are dispatched from the rules engine to the peripheral device. The instructions are configured to cause a stimulus to a user of the peripheral device prior to the user attempting to consummate an action on the web site.



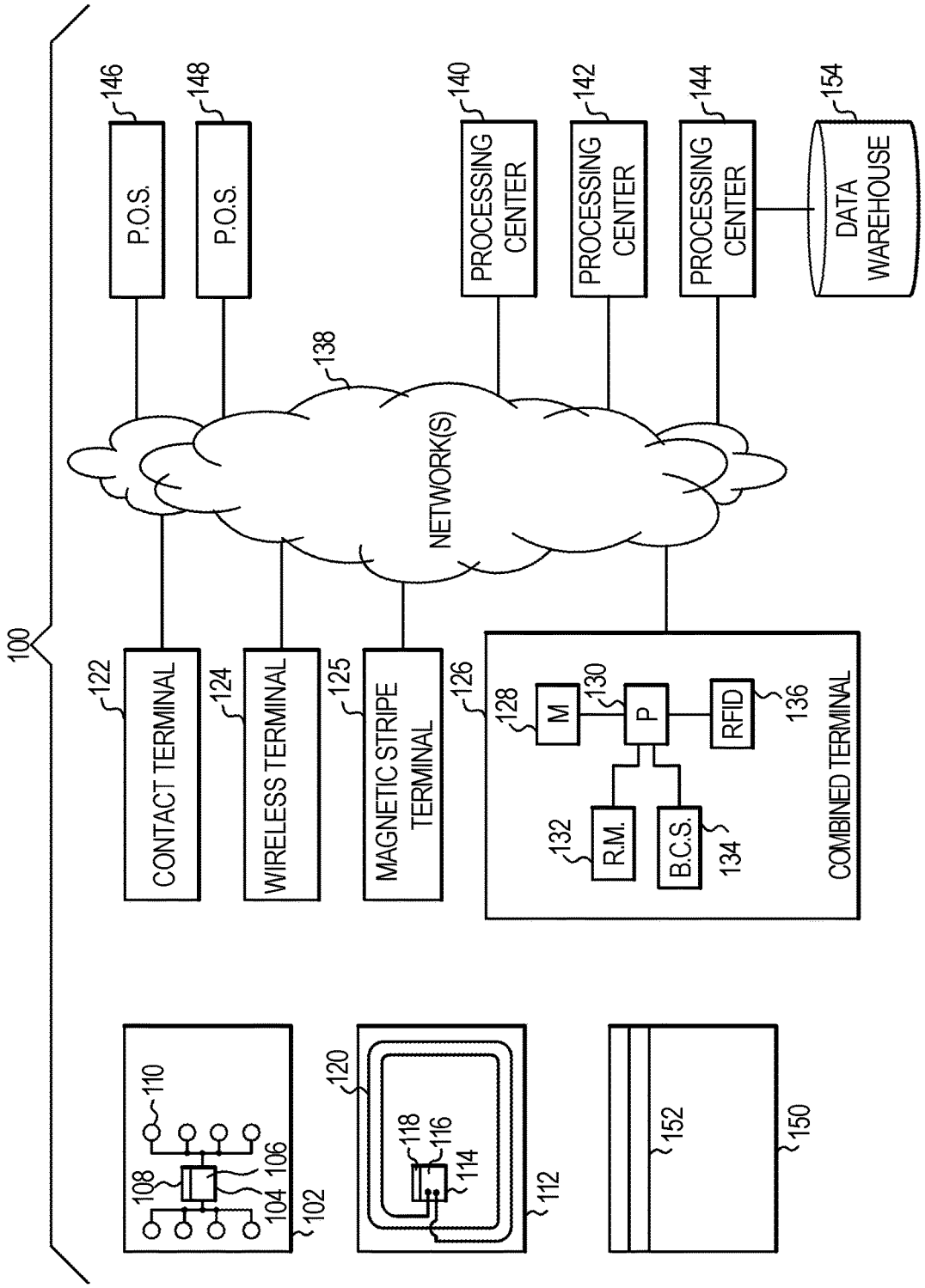

100
102
104
106
108
110
112
114
116
118
120
122
CONTACT TERMINAL
124
WIRELESS TERMINAL
125
MAGNETIC STRIPE TERMINAL
126
128
M
130
P
132
R.M.
134
B.C.S.
136
RFID
COMBINED TERMINAL
138
NETWORK(S)
140
PROCESSING CENTER
142
PROCESSING CENTER
144
PROCESSING CENTER
146
P.O.S.
148
P.O.S.
150
152
154
DATA WAREHOUSE

FIG. 1

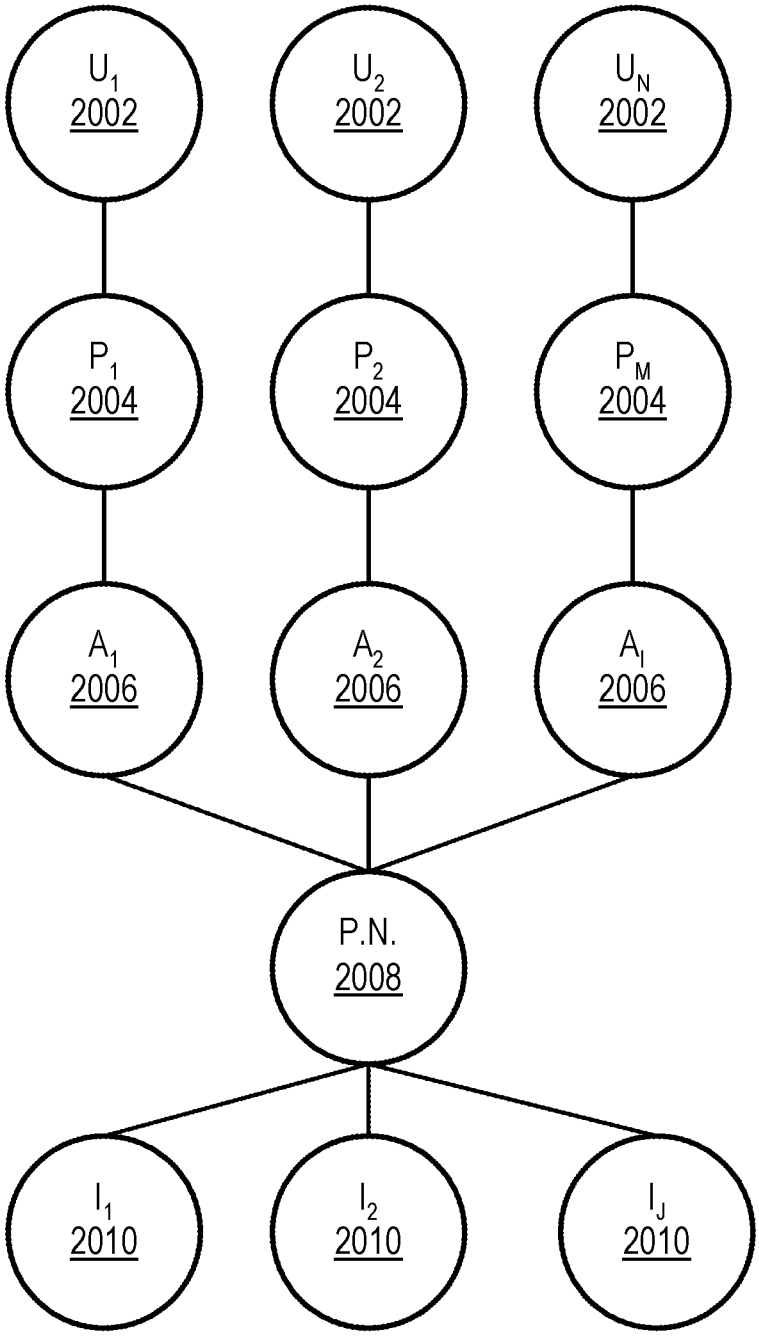

U1
2002
U2
2002
UN
2002
P1
2004
P2
2004
PM
2004
A1
2006
A2
2006
AI
2006
P.N.
2008
I1
2010
I2
2010
IJ
2010

FIG. 2

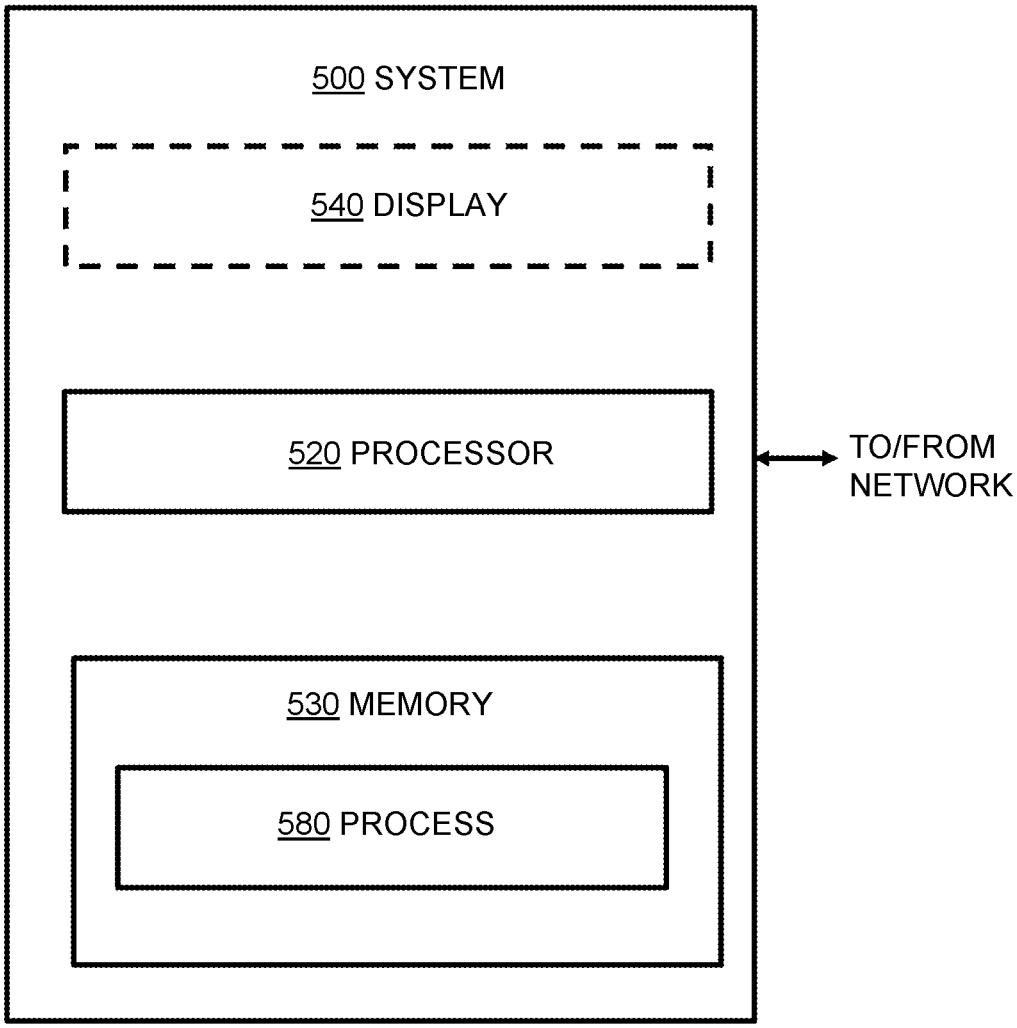

500 SYSTEM
540 DISPLAY
520 PROCESSOR
TO/FROM
NETWORK
530 MEMORY
580 PROCESS

FIG. 3

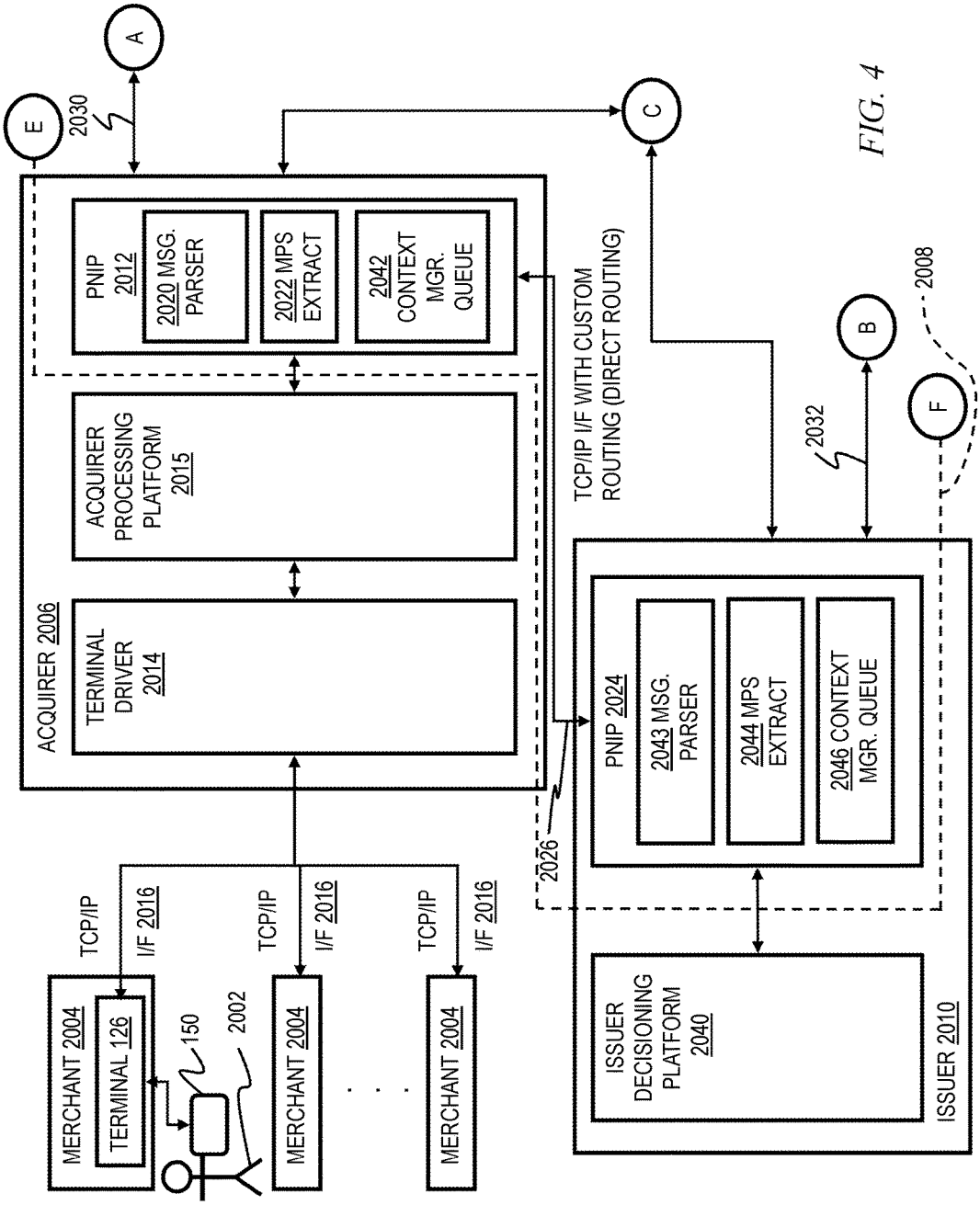

A
E
2030
C
PNIP 2012
2020 MSG. PARSER
2022 MPS EXTRACT
2042 CONTEXT MGR. QUEUE
ACQUIRER PROCESSING PLATFORM 2015
TERMINAL DRIVER 2014
ACQUIRER 2006
TCP/IP I/F WITH CUSTOM ROUTING (DIRECT ROUTING)
B
2008
F
2032
PNIP 2024
2043 MSG. PARSER
2044 MPS EXTRACT
2046 CONTEXT MGR. QUEUE
2026
ISSUER DECISIONING PLATFORM 2040
ISSUER 2010
TCP/IP
I/F 2016
MERCHANT 2004
TERMINAL 126
150
2002
MERCHANT 2004
MERCHANT 2004

FIG. 4

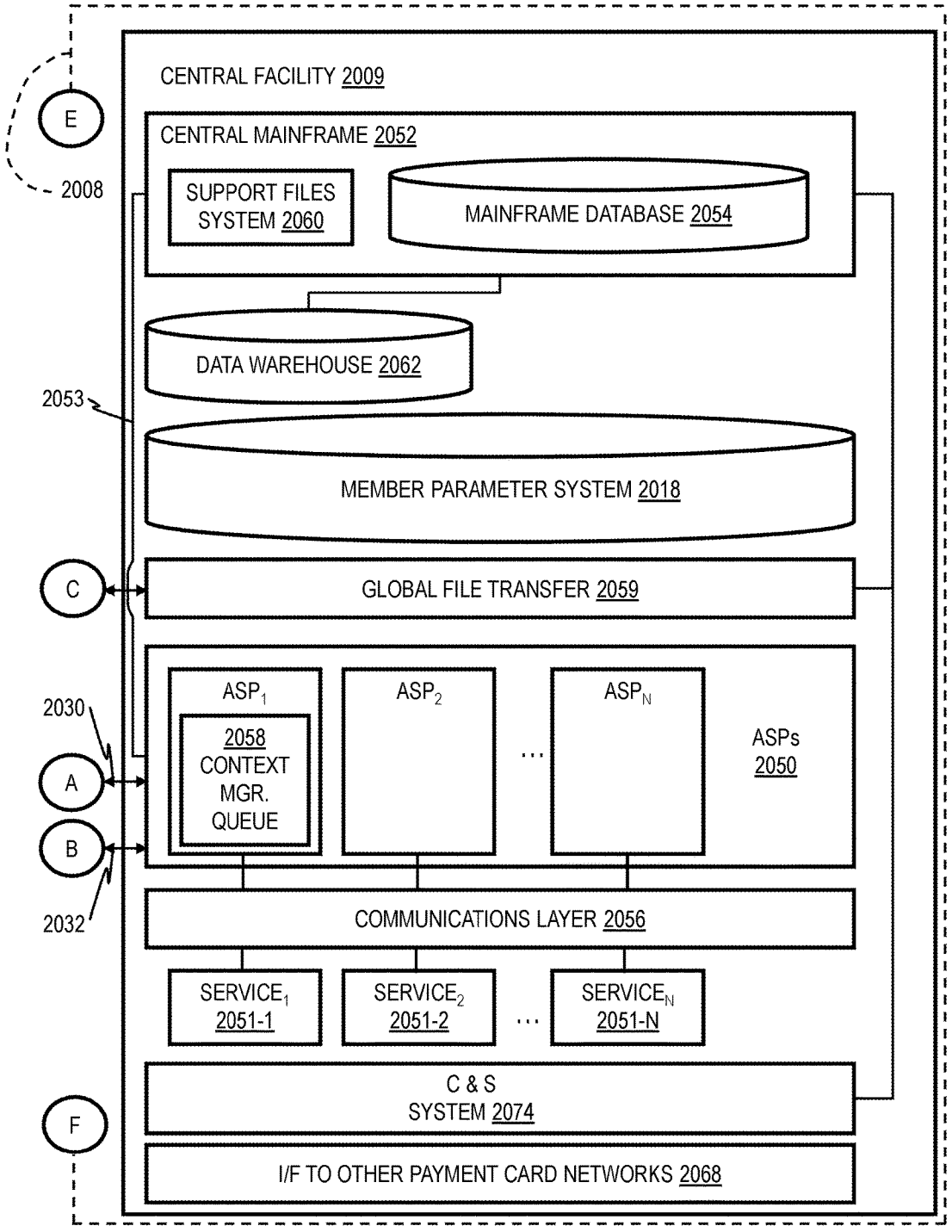

CENTRAL FACILITY 2009
E
2008
CENTRAL MAINFRAME 2052
SUPPORT FILES SYSTEM 2060
MAINFRAME DATABASE 2054
DATA WAREHOUSE 2062
2053
MEMBER PARAMETER SYSTEM 2018
C
GLOBAL FILE TRANSFER 2059
2030
A
B
2032
ASP1
2058 CONTEXT MGR. QUEUE
ASP2
ASPN
ASPs 2050
COMMUNICATIONS LAYER 2056
SERVICE1 2051-1
SERVICE2 2051-2
SERVICEN 2051-N
C & S SYSTEM 2074
F
I/F TO OTHER PAYMENT CARD NETWORKS 2068

FIG. 5

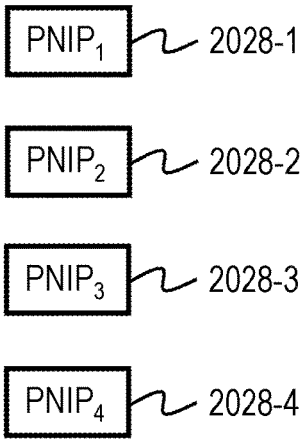

PNIP1
2028-1
PNIP2
2028-2
PNIP3
2028-3
PNIP4
2028-4

FIG. 6

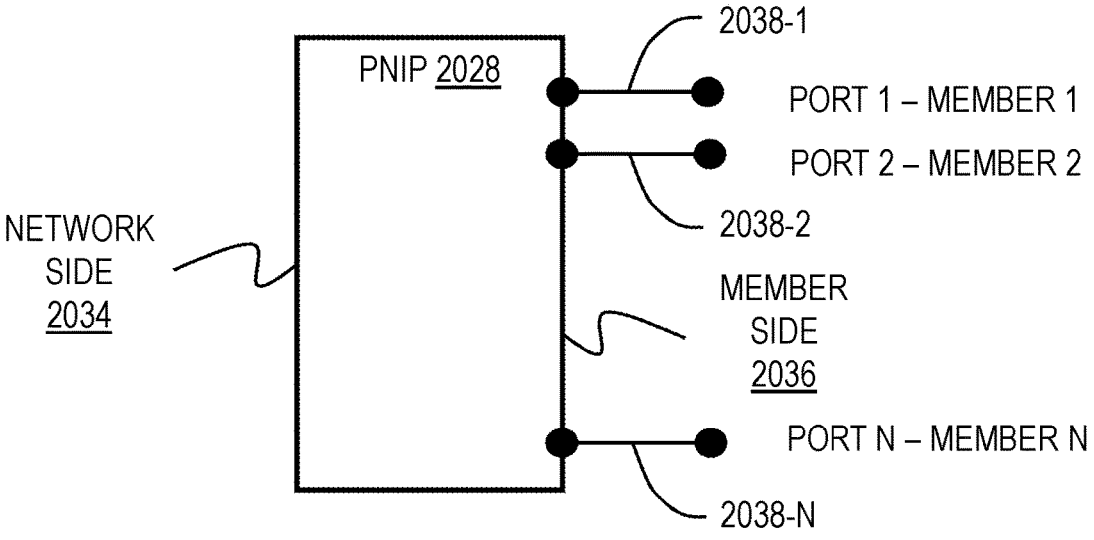

PNIP 2028
2038-1
PORT 1 – MEMBER 1
PORT 2 – MEMBER 2
2038-2
NETWORK SIDE 2034
MEMBER SIDE 2036
PORT N – MEMBER N
2038-N

FIG. 7

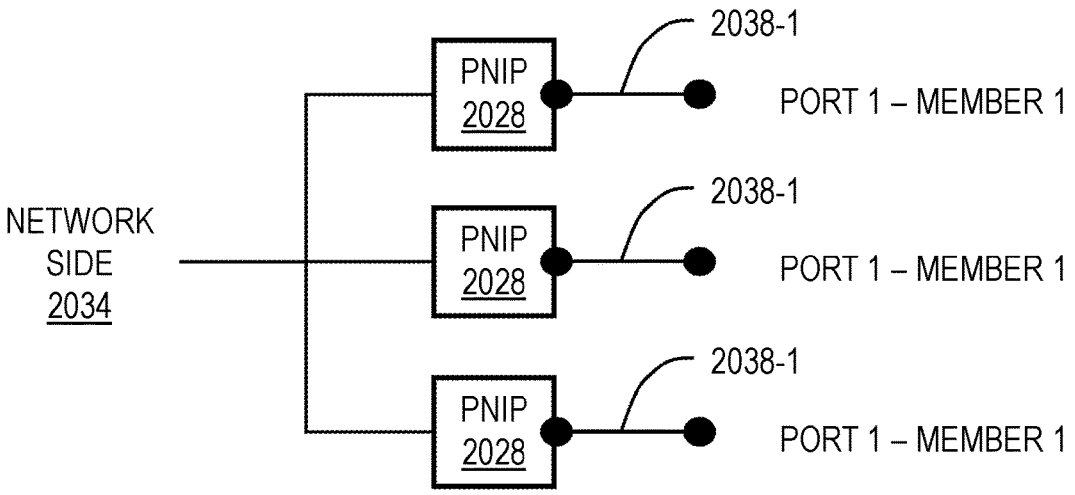

NETWORK SIDE 2034
PNIP 2028
PNIP 2028
PNIP 2028
2038-1
2038-1
2038-1
PORT 1 – MEMBER 1
PORT 1 – MEMBER 1
PORT 1 – MEMBER 1

FIG. 8

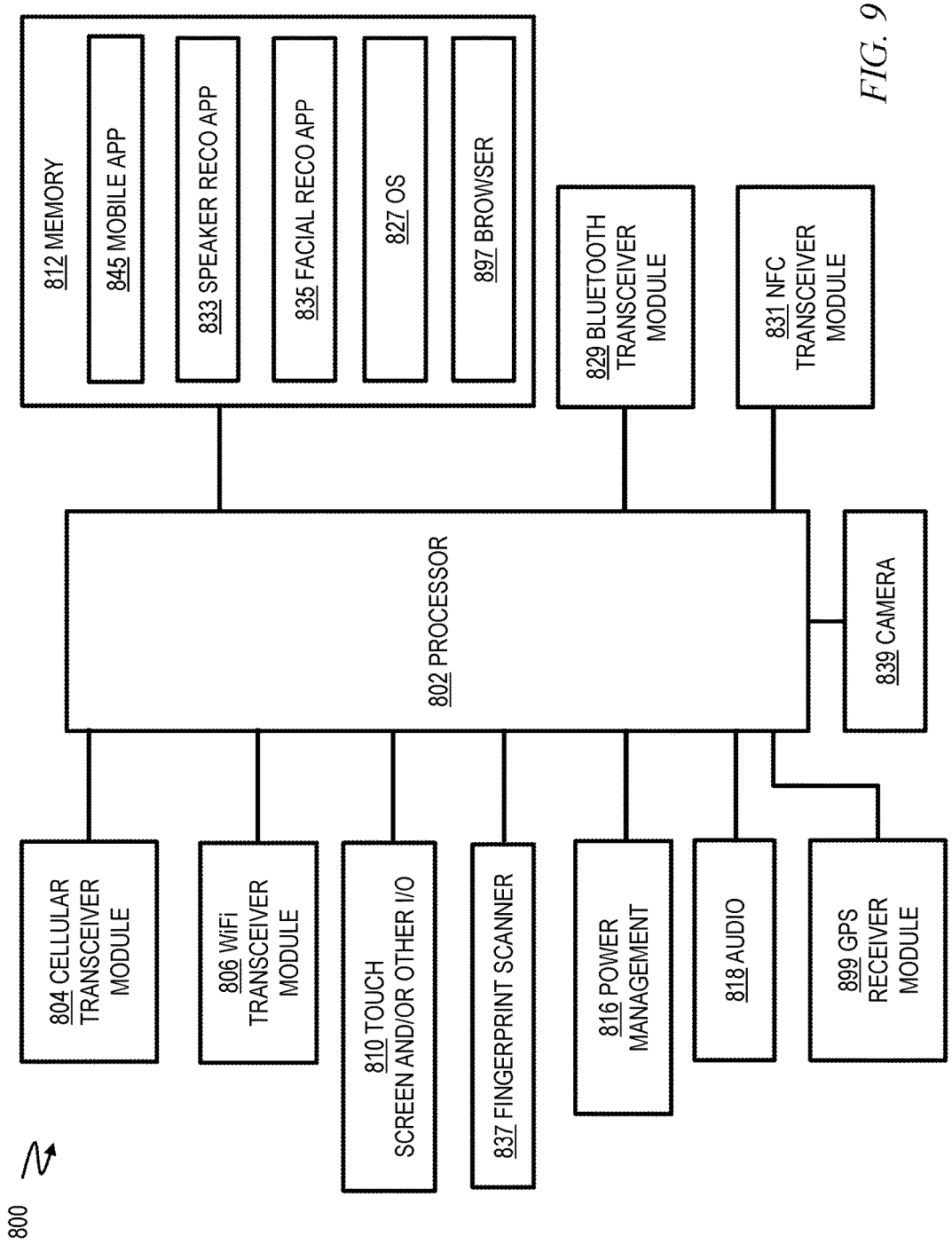

800
804 CELLULAR TRANSCEIVER MODULE
806 WiFi TRANSCEIVER MODULE
810 TOUCH SCREEN AND/OR OTHER I/O
837 FINGERPRINT SCANNER
816 POWER MANAGEMENT
818 AUDIO
899 GPS RECEIVER MODULE
802 PROCESSOR
839 CAMERA
829 BLUETOOTH TRANSCEIVER MODULE
831 NFC TRANSCEIVER MODULE
812 MEMORY
845 MOBILE APP
833 SPEAKER RECO APP
835 FACIAL RECO APP
827 OS
897 BROWSER

FIG. 9

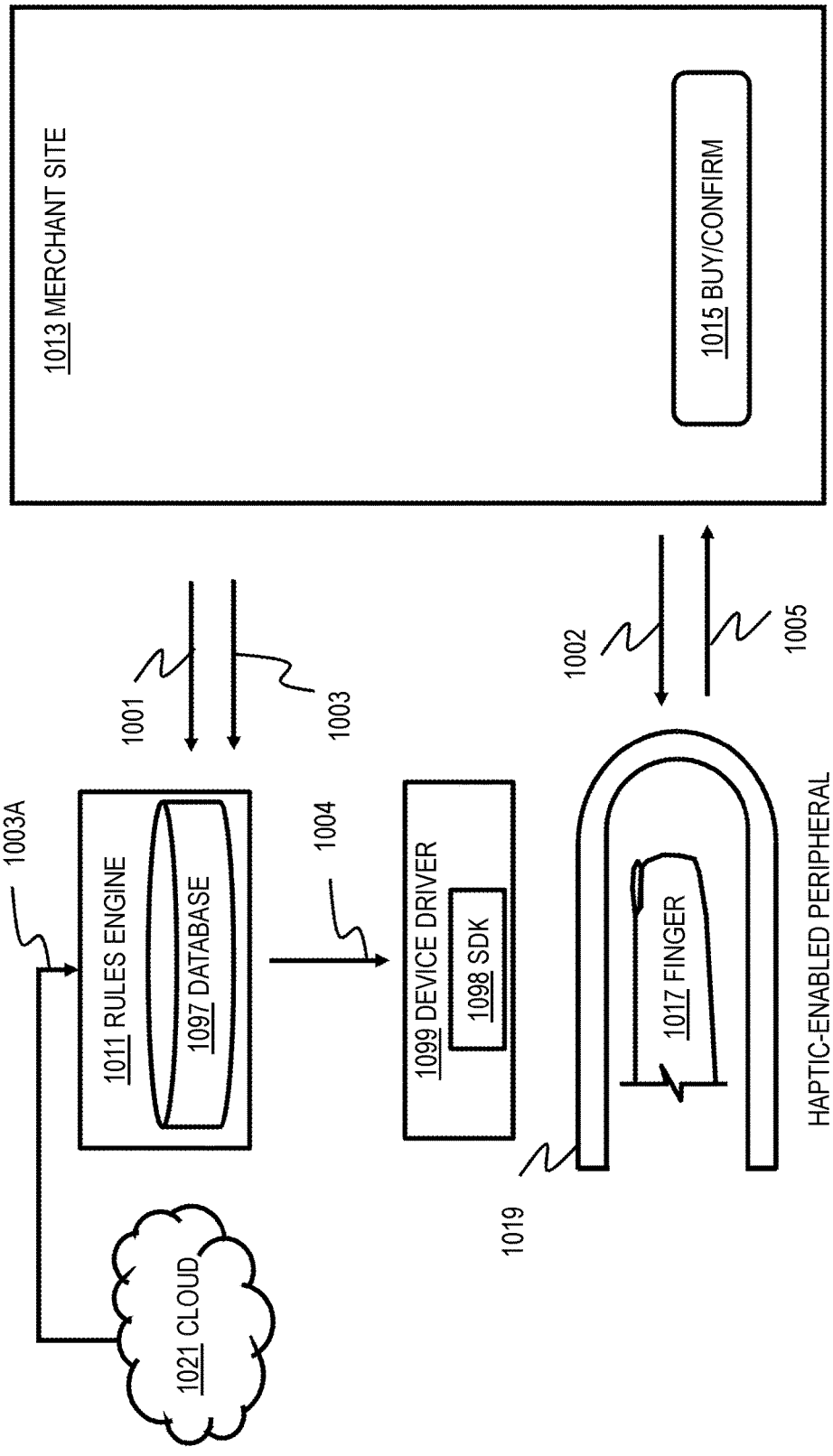

1013 MERCHANT SITE
1015 BUY/CONFIRM
1001
1003
1002
1005
1003A
1011 RULES ENGINE
1097 DATABASE
1004
1099 DEVICE DRIVER
1098 SDK
1017 FINGER
HAPTIC-ENABLED PERIPHERAL
1019
1021 CLOUD

FIG. 10

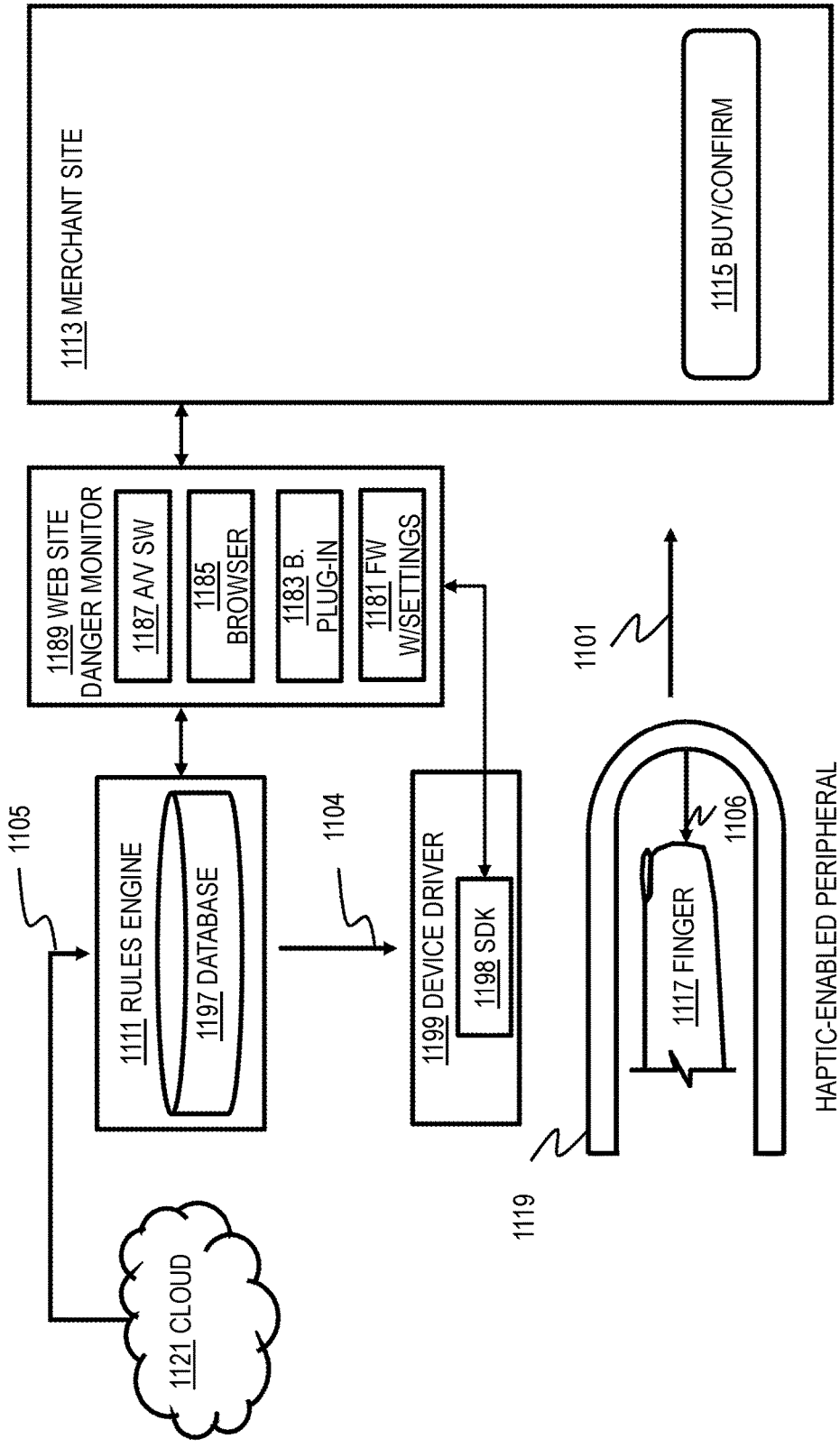

1113 MERCHANT SITE
1115 BUY/CONFIRM
1189 WEB SITE DANGER MONITOR
1187 A/V SW
1185 BROWSER
1183 B. PLUG-IN
1181 FW W/SETTINGS
1101
1105
1111 RULES ENGINE
1197 DATABASE
1104
1199 DEVICE DRIVER
1198 SDK
1106
1117 FINGER
HAPTIC-ENABLED PERIPHERAL
1119
1121 CLOUD

FIG. 11

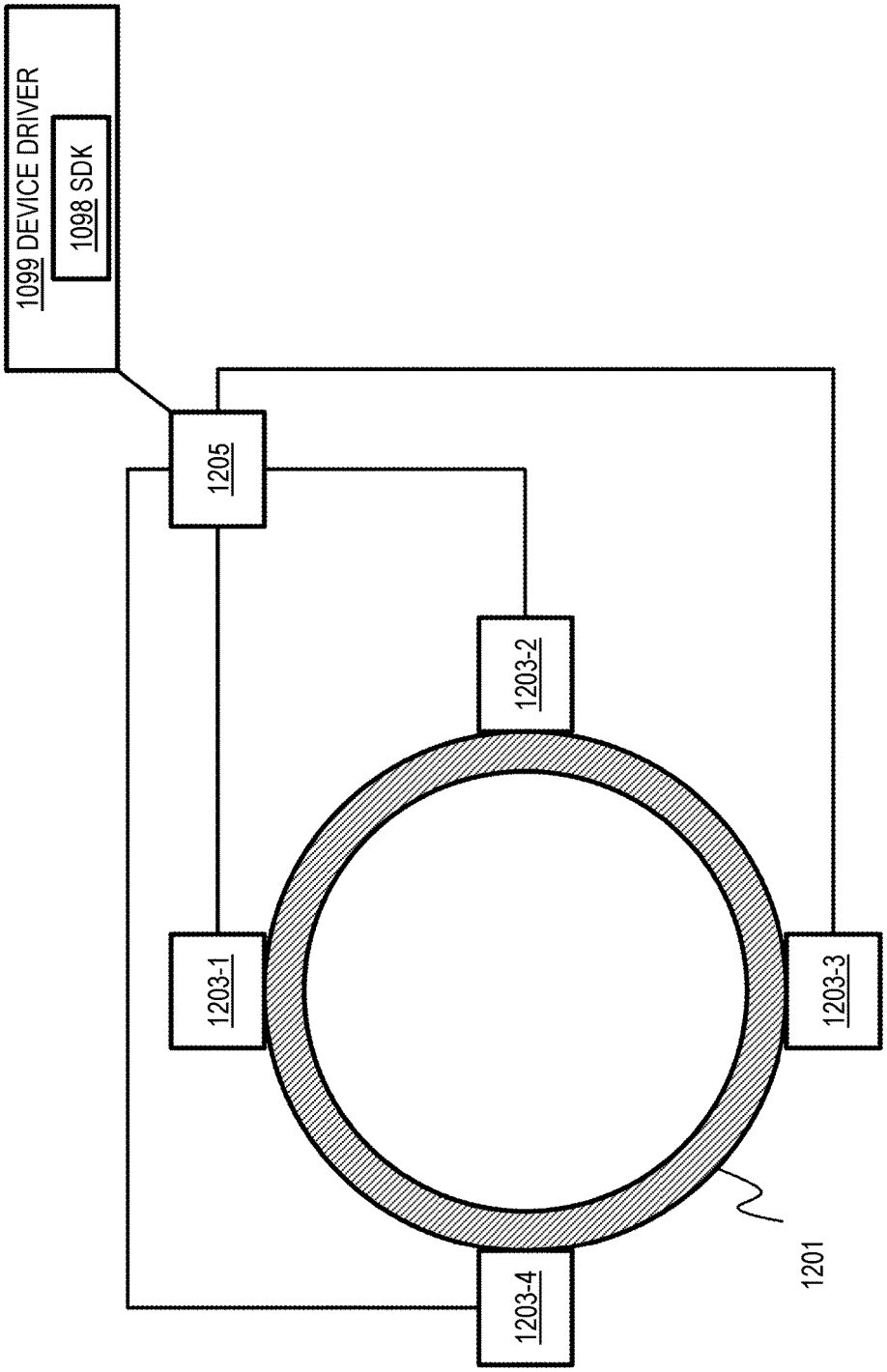

1099 DEVICE DRIVER
1098 SDK
1205
1203-1
1203-2
1203-3
1203-4
1201

FIG. 12

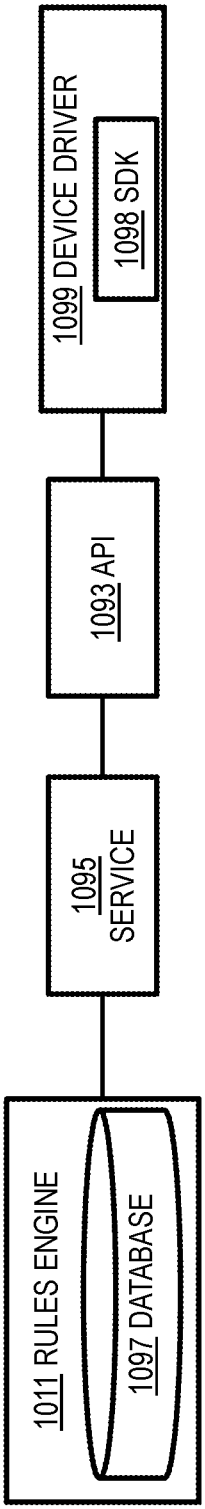

1011 RULES ENGINE
1097 DATABASE
1095 SERVICE
1093 API
1099 DEVICE DRIVER
1098 SDK

FIG. 13

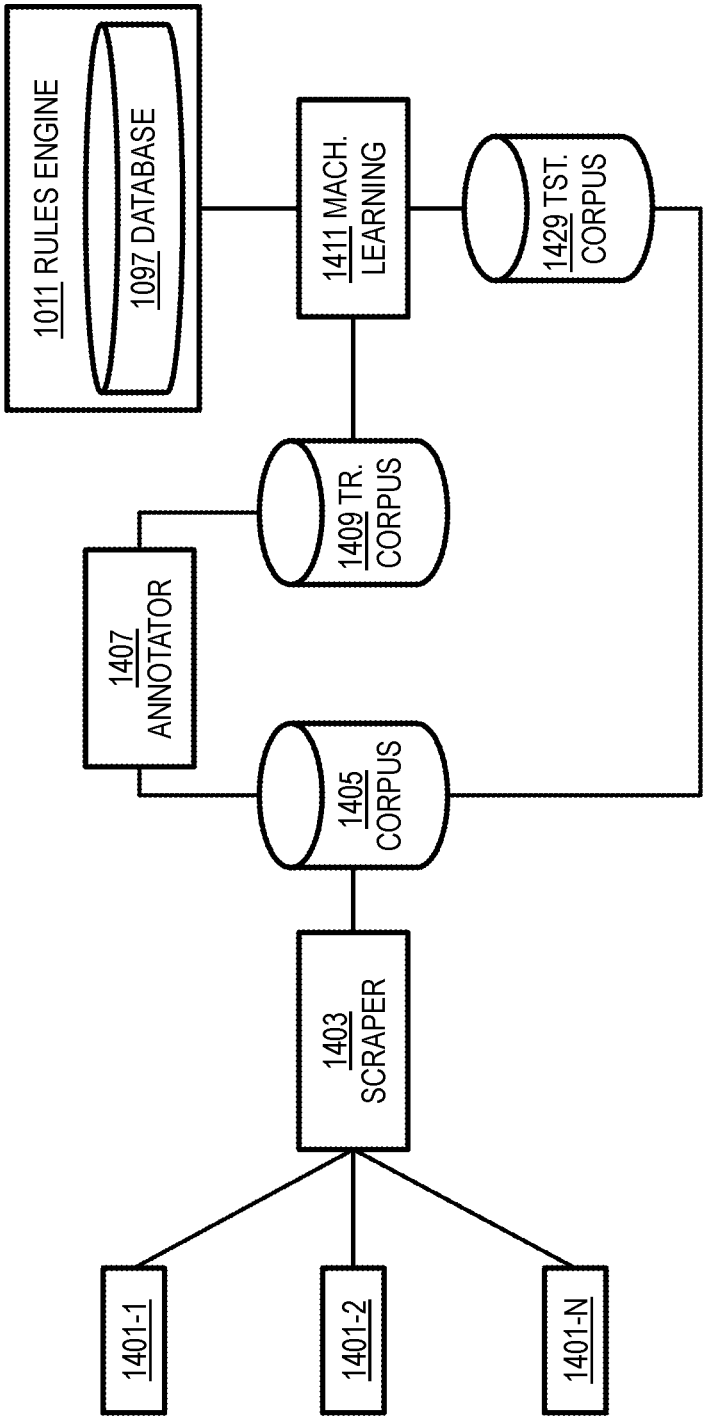

1011 RULES ENGINE
1097 DATABASE
1411 MACH. LEARNING
1429 TST. CORPUS
1409 TR. CORPUS
1407 ANNOTATOR
1405 CORPUS
1403 SCRAPER
1401-1
1401-2
1401-N

FIG. 14

HAPTIC INTERACTION

FIELD OF THE INVENTION

[0001] The present invention relates generally to the use of haptic technology in the electronic and computer arts, and, more particularly, but not exclusively, to use of haptic technology and/or related stimuli in electronic commerce and the like.

BACKGROUND OF THE INVENTION

[0002] Haptic communication recreates the sense of touch by applying forces, vibrations, and/or motions to a user. Uses include assistance in the creation of virtual objects in a computer simulation, control of such virtual objects, and enhancement of the remote control of machines and devices. Haptic devices may incorporate tactile sensors that measure forces exerted by the user on the interface.

[0003] In virtual reality systems, haptics add the sense of touch to previous visual-only interfaces. Haptics may be useful for those who are visually impaired, but can also provide an enhanced user experience for those having unimpaired vision.

SUMMARY OF THE INVENTION

[0004] Principles of the present invention provide techniques for haptic interaction with a consumer to incentivize and/or restrict a purchase transaction. In one aspect, an exemplary method, according to an aspect of the invention, includes obtaining, at a rules engine, a web site map of an external web site. The web site map includes information permitting determination of at least one pertinent location on the web site. Further steps include obtaining, at the rules engine, at least one rule specifying peripheral behavior in a region adjacent the at least one pertinent location on the web site; obtaining, at the rules engine, an indication that a peripheral device corresponding to the at least one rule is being used to browse the web site; and dispatching, from the rules engine to the peripheral device, instructions corresponding to the at least one rule specifying the peripheral behavior in the region adjacent the at least one pertinent location on the web site. The instructions are configured to cause a stimulus to a user of the peripheral device prior to the user attempting to consummate an action on the web site.

[0005] In another aspect, another exemplary method, according to another aspect of the invention, includes obtaining, at a rules engine, at least one rule specifying peripheral behavior when browsing a web site for which a site map is not available to the rules engine; obtaining, at the rules engine, an indication that a peripheral device corresponding to the at least one rule is being used to browse the web site; and dispatching, from the rules engine to the peripheral device, instructions corresponding to the at least one rule specifying the peripheral behavior when browsing the web site. The instructions are configured to cause a stimulus to a user of the peripheral device prior to the user attempting to consummate an action on the web site.

[0006] Aspects of the invention contemplate the method(s) described herein performed by one or more entities herein, as well as facilitating of one or more method steps by the same or different entities. As used herein, "facilitating" an action includes performing the action, making the action easier, helping to carry the action out, or causing the action to be performed. Thus, by way of example and not limitation, instructions executing on one processor might facilitate an action carried out by instructions executing on a remote processor, by sending appropriate data or commands to cause or aid the action to be performed. For the avoidance of doubt, where an actor facilitates an action by other than performing the action, the action is nevertheless performed by some entity or combination of entities.

[0007] One or more embodiments of the invention or elements thereof can be implemented in the form of a computer program product including a tangible computer readable recordable storage medium with computer usable program code for performing the method steps indicated stored thereon in a non-transitory manner. Furthermore, one or more embodiments of the invention or elements thereof can be implemented in the form of a system (or apparatus) including a memory and at least one processor that is coupled to the memory and operative to perform exemplary method steps (e.g., when instructions from a persistent storage device are loaded into the memory to configure the processor). Yet further, in another aspect, one or more embodiments of the invention or elements thereof can be implemented in the form of means for carrying out one or more of the method steps described herein; the means can include (i) specialized hardware module(s), (ii) software module(s) stored in a non-transitory manner in a tangible computer-readable recordable storage medium (or multiple such media) and implemented on a hardware processor, or (iii) a combination of (i) and (ii); any of (i)-(iii) implement the specific techniques set forth herein. Transmission medium(s) per se and disembodied signals per se are defined to be excluded from the claimed means.

[0008] One or more embodiments of the invention can provide substantial beneficial technical effects, such as:

[0009] increasing accessibility to web sites and the like for the visually impaired;

[0010] enhancing security in electronic commerce and/or web browsing;

[0011] warning and/or assisting the visually impaired; and/or

[0012] allowing haptic feedback on a web site with minimal effort on the part of the site developer (e.g., using a standardized web markup technique without the requirement for a specialized browser plugin—note that some embodiments make use of browser plug-ins for anti-virus and/or malware detection).

[0013] These and other features and advantages of the present invention will become apparent from the following detailed description of illustrative embodiments thereof, which is to be read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. **1** shows an example of a system and various components thereof that can implement at least a portion of some techniques of the invention;

[0015] FIG. **2** depicts an exemplary inter-relationship between and among: (i) a payment network configured to facilitate transactions between multiple issuers and multiple acquirers, (ii) a plurality of users, (iii) a plurality of merchants, (iv) a plurality of acquirers, and (v) a plurality of issuers, useful in connection with one or more embodiments of the invention;

[0016] FIG. **3** is a block diagram of an exemplary computer system useful in one or more embodiments of the invention;

[0017] FIGS. **4** and **5** provide an exemplary detailed view of operation of a payment card network, in accordance with an aspect of the disclosure;

[0018] FIG. **6** shows a group of payment network interface processors, such as may be used with the network of FIGS. **4** and **5**;

[0019] FIG. **7** shows a port arrangement on a payment network interface processor, such as may be used with the network of FIGS. **4** and **5**;

[0020] FIG. **8** shows a case wherein an issuer has multiple payment network interface processors;

[0021] FIG. **9** is a block diagram of a "smart" phone or tablet computer useful in one or more embodiments of the invention;

[0022] FIG. **10** is a combined block diagram and data flow diagram depicting a first embodiment of a system and method, according to an aspect of the invention;

[0023] FIG. **11** is a combined block diagram and data flow diagram depicting a second embodiment of a system and method, according to an aspect of the invention;

[0024] FIG. **12** shows an exemplary haptic peripheral device, according to an aspect of the invention;

[0025] FIG. **13** shows provision of a rules engine as a service, according to an aspect of the invention; and

[0026] FIG. **14** shows an exemplary machine learning process, according to an aspect of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Payment Devices and Associated Payment Processing Networks

[0027] With regard to payment card and similar payments, attention should now be given to FIG. **1**, which depicts an exemplary embodiment of a system **100**, according to an aspect of the invention, and including various possible components of the system. System **100** can include one or more different types of portable payment devices. For example, one such device can be a contact device such as card **102**. Card **102** can include an integrated circuit (IC) chip **104** having a processor portion **106** and a memory portion **108**. A plurality of electrical contacts **110** can be provided for communication purposes. In addition to or instead of card **102**, system **100** can also be designed to work with a contactless device such as card **112**. Card **112** can include an IC chip **114** having a processor portion **116** and a memory portion **118**. An antenna **120** can be provided for contactless communication, such as, for example, using radio frequency (RF) electromagnetic waves. An oscillator or oscillators, and/or additional appropriate circuitry for one or more of modulation, demodulation, downconversion, and the like can be provided. Note that cards **102**, **112** are exemplary of a variety of devices that can be employed. The system **100** typically functions with other types of devices in lieu of or in addition to "smart" or "chip" cards **102**, **112**; for example, a conventional card **150** having a magnetic stripe **152**. Furthermore, an appropriately configured mobile device (e.g., "smart" cellular telephone handset, tablet, personal digital assistant (PDA), and the like) can be used to carry out contactless payments in some instances; for example, via near field communications (NFC), wherein the appropriately configured mobile device acts like a contactless card **112** (or, with an electronic wallet present, like multiple such cards).

[0028] The ICs **104**, **114** can contain processing units **106**, **116** and memory units **108**, **118**. Preferably, the ICs **104**, **114** can also include one or more of control logic, a timer, and input/output ports. Such elements are well known in the IC art and are not separately illustrated. One or both of the ICs **104**, **114** can also include a co-processor, again, well-known and not separately illustrated. The control logic can provide, in conjunction with processing units **106**, **116**, the control necessary to handle communications between memory unit **108**, **118** and the input/output ports. The timer can provide a timing reference signal from processing units **106**, **116** and the control logic. The co-processor could provide the ability to perform complex computations in real time, such as those required by cryptographic algorithms.

[0029] The memory portions or units **108**, **118** may include different types of memory, such as volatile and non-volatile memory and read-only and programmable memory. The memory units can store transaction card data such as, e.g., a user's primary account number ("PAN") and/or personal identification number ("PIN"). The memory portions of units **108**, **118** can store the operating system of the cards **102**, **112**. The operating system loads and executes applications and provides file management or other basic card services to the applications. One operating system that can be used is the MULTOS® operating system licensed by MAOSCO Limited. (MAOSCO Limited, St. Andrews House, The Links, Kelvin Close, Birchwood, Warrington, WA3 7PB, United Kingdom) Alternatively, JAVA CARD™-based operating systems, based on JAVA CARD™ technology (licensed by Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, Calif. 95054 USA), or proprietary operating systems available from a number of vendors, could be employed. Preferably, the operating system is stored in read-only memory ("ROM") within memory portion **108**, **118**. In an alternate embodiment, flash memory or other non-volatile and/or volatile types of memory may also be used in the memory units **108**, **118**.

[0030] In addition to the basic services provided by the operating system, memory portions **108**, **118** may also include one or more applications. At present, one possible specification to which such applications may conform is the EMV interoperable payments specification set forth by EMVCo, LLC (901 Metro Center Boulevard, Mailstop M3-3D, Foster City, Calif., 94404, USA). It will be appreciated that applications can be configured in a variety of different ways.

[0031] The skilled artisan will also be familiar with the Mastercard® Contactless specifications (the skilled artisan will appreciate that MASTERCARD CONTACTLESS was formerly known as MASTERCARD PAYPASS), available under license from Mastercard International Incorporated of Purchase, N.Y., USA (marks of Mastercard International Incorporated of Purchase, N.Y., USA).

[0032] As noted, cards **102**, **112** are examples of a variety of payment devices that can be employed. The primary function of the payment devices may not be payment, for example, they may be cellular phone handsets that implement appropriate techniques. Such devices could include cards having a conventional form factor, smaller or larger cards, cards of different shape, key fobs, personal digital assistants (PDAs), appropriately configured cell phone

handsets, or indeed any device with the appropriate capabilities. In some cases, the cards, or other payment devices, can include body portions (e.g., laminated plastic layers of a payment card, case or cabinet of a PDA, chip packaging, and the like), memories **108**, **118** associated with the body portions, and processors **106**, **116** associated with the body portions and coupled to the memories. The memories **108**, **118** can contain appropriate applications. The processors **106**, **116** can be operative to execute one or more steps. The applications can be, for example, application identifiers (AIDs) linked to software code in the form of firmware plus data in a card memory such as an electrically erasable programmable read-only memory (EEPROM).

[0033] A number of different types of terminals can be employed with system **100**. Such terminals can include a contact terminal **122** configured to interface with contact-type device **102**, a wireless terminal **124** configured to interface with wireless device **112**, a magnetic stripe terminal **125** configured to interface with a magnetic stripe device **150**, or a combined terminal **126**. Combined terminal **126** is designed to interface with any combination of devices **102**, **112**, **150**. Some terminals can be contact terminals with plug-in contactless readers. Combined terminal **126** can include a memory **128**, a processor portion **130**, a reader module **132**, and optionally an item interface module such as a bar code scanner **134** and/or a radio frequency identification (RFID) tag reader **136**. Items **128**, **132**, **134**, **136** can be coupled to the processor **130**. Note that the principles of construction of terminal **126** are applicable to other types of terminals and are described in detail for illustrative purposes. Reader module **132** can, in general, be configured for contact communication with card or device **102**, contactless communication with card or device **112**, reading of magnetic stripe **152**, or a combination of any two or more of the foregoing (different types of readers can be provided to interact with different types of cards e.g., contacted, magnetic stripe, or contactless). Terminals **122**, **124**, **125**, **126** can be connected to one or more processing centers **140**, **142**, **144** via a computer network **138**. Network **138** could include, for example, the Internet, or a proprietary network (e.g., a virtual private network (VPN) such as is described with respect to FIG. **2** below). More than one network could be employed to connect different elements of the system. For example, a local area network (LAN) could connect a terminal to a local server or other computer at a retail establishment or the like. A payment network could connect acquirers and issuers. Further details regarding one specific form of payment network will be provided below. Processing centers **140**, **142**, **144** can include, for example, a host computer of an issuer of a payment device.

[0034] Many different retail or other establishments, represented by points-of-sale **146**, **148**, can be connected to network **138**. Different types of portable payment devices, terminals, or other elements or components can combine or "mix and match" one or more features depicted on the exemplary devices in FIG. **1**.

[0035] Portable payment devices can facilitate transactions by a user with a terminal, such as **122**, **124**, **125**, **126**, of a system such as system **100**. Such a device can include a processor, for example, the processing units **106**, **116** discussed above. The device can also include a memory, such as memory portions **108**, **118** discussed above, that is coupled to the processor. Further, the device can include a communications module that is coupled to the processor and configured to interface with a terminal such as one of the terminals **122**, **124**, **125**, **126**. The communications module can include, for example, the contacts **110** or antennas **120** together with appropriate circuitry (such as the aforementioned oscillator or oscillators and related circuitry) that permits interfacing with the terminals via contact or wireless communication. The processor of the apparatus can be operable to perform one or more steps of methods and techniques. The processor can perform such operations via hardware techniques, and/or under the influence of program instructions, such as an application, stored in one of the memory units.

[0036] The portable device can include a body portion. For example, this could be a laminated plastic body (as discussed above) in the case of "smart" or "chip" cards **102**, **112**, or the handset chassis and body in the case of a cellular telephone, tablet, or the like.

[0037] It will be appreciated that the terminals **122**, **124**, **125**, **126** are examples of terminal apparatuses for interacting with a payment device of a holder. The apparatus can include a processor such as processor **130**, a memory such as memory **128** that is coupled to the processor, and a communications module such as **132** that is coupled to the processor and configured to interface with the portable apparatuses **102**, **112**, **150**. The processor **130** can be operable to communicate with portable payment devices of a user via the communications module **132**. The terminal apparatuses can function via hardware techniques in processor **130**, or by program instructions stored in memory **128**. Such logic could optionally be provided from a central location such as processing center **140** over network **138**. The aforementioned bar code scanner **134** and/or RFID tag reader **136** can optionally be provided, and can be coupled to the processor, to gather attribute data, such as a product identification, from a UPC code or RFID tag on a product to be purchased.

[0038] The above-described devices **102**, **112** can be ISO 7816-compliant contact cards or devices or NFC (Near Field Communications) or ISO 14443-compliant proximity cards or devices. In operation, card **112** can be touched or tapped on the terminal **124** or **128** (or an associated reader), which then contactlessly transmits the electronic data to the proximity IC chip in the card **112** or other wireless device.

[0039] One or more of the processing centers **140**, **142**, **144** can include a database such as a data warehouse **154**.

[0040] It should be noted that the system depicted in FIG. **1** may involve not only conventional transactions at "brick and mortar" merchants, but also, card-not-present transactions, such as card-not-present Internet transactions or card-not-present recurring payments. In some instances, an Internet Protocol (IP) address may be captured during card-not-present Internet transactions. In exemplary card-not-present Internet transactions, an individual utilizes his or her home computer to communicate with a server of an e-commerce merchant over the Internet. The individual provides his or her PAN to the merchant's server. The merchant utilizes the PAN to initiate an authorization request, and upon receiving an authorization request response indicating approval, will complete the e-commerce transaction. In exemplary card-not-present recurring payments, an individual provides his or her PAN and related data to a merchant (e.g., via phone or postal mail). The merchant utilizes the PAN to initiate an authorization request, and upon receiving an authorization request response indicating approval, will complete the

recurring transaction. It should be noted that one or more embodiments are applicable to both token-based transactions (see, e.g., "EMV® Payment Tokenisation Specification: Technical Framework," Version 1.0, March 2014, EMVCo, LLC ("EMVCo"), expressly incorporated herein by reference in its entirety for all purposes) and PAN-based transactions.

[0041] In some cases, there can be payment card accounts which do not have physical cards or other physical payment devices associated therewith; for example, a customer can be provided with a PAN, expiration date, and security code but no physical payment device, and use same, for example, for card-not-present telephone or internet transactions. In this regard, a "cardholder" should be understood to refer to the account holder of a payment card account, regardless of whether the holder actually has a physical payment card or other physical payment device.

[0042] With reference to FIG. **2**, an exemplary relationship among multiple entities is depicted. A number of different users (e.g., consumers) **2002**, U_1, U_2 . . . U_N, interact with a number of different merchants **2004**, P_1, P_2 . . . P_M. Merchants **2004** interact with a number of different acquirers **2006**, A_1, A_2 . . . A_L Acquirers **2006** interact with a number of different issuers **2010**, I_1, I_2 . . . I_J, through, for example, a single operator **2008** of a payment network configured to facilitate transactions between multiple issuers and multiple acquirers; for example, Mastercard International Incorporated, operator of the BANKNET® network, or Visa International Service Association, operator of the VISANET® network. In general, N, M, I, and J are integers that can be equal or not equal. Note also that elements **2006**, **2010** represent the entities that actually carry out processing for the acquirers and issuers respectively; in some instances, these entities carry out their own processing; in other entities, they utilize acquirer processors and issuer processors, respectively.

[0043] During a conventional credit authorization process, the cardholder **2002** pays for the purchase and the merchant **2004** submits the transaction to the acquirer (acquiring bank) **2006**. The acquirer verifies the card number, the transaction type and the amount with the issuer **2010** and reserves that amount of the cardholder's credit limit for the merchant. At this point, the authorization request and response have been exchanged, typically in real time. Authorized transactions are stored in "batches," which are sent to the acquirer **2006**. During subsequent clearing and settlement, the acquirer sends the batch transactions through the credit card association, which debits the issuers **2010** for payment and credits the acquirer **2006**. Once the acquirer **2006** has been paid, the acquirer **2006** pays the merchant **2004**.

[0044] It will be appreciated that the network **2008** shown in FIG. **2** is an example of a payment network configured to facilitate transactions between multiple issuers and multiple acquirers, which may be thought of as an "open" system. Some embodiments of the invention may be employed in relation to payment card accounts using other kinds of payment networks, for example, proprietary or closed payments networks with only a single issuer and acquirer. Furthermore in this regard, FIG. **2** depicts a four party model, as will be known to the skilled artisan; the four parties are the consumer **2002**, merchant **2004**, acquirer **2006**, and issuer **2010**. However, at least some embodiments are also of use with three-party models, wherein the acquirer and issuer are the same entity.

[0045] Messages within a network such as network **138** and/or network **2008**, may, in at least some instances, conform to the International Organization for Standardization (ISO) Standard 8583, Financial transaction card originated messages Interchange message specifications, which is the ISO standard for systems that exchange electronic transactions made by cardholders using payment cards. It should be noted that the skilled artisan will be familiar with the ISO 8583 standards. Nevertheless, out of an abundance of caution, the following documents are expressly incorporated herein by reference in their entirety for all purposes (published by ISO, Geneva, Switzerland, and available on the ISO web site):

[0046] ISO 8583 Part 1: Messages, data elements and code values (2003)

[0047] ISO 8583 Part 2: Application and registration procedures for Institution Identification Codes (IIC) (1998)

[0048] ISO 8583 Part 3: Maintenance procedures for messages, data elements and code values (2003)

[0049] ISO 8583:1993 (1993)

[0050] ISO 8583:1987 (1987)

[0051] As used herein, a "payment card network" is a communications network that uses payment card account numbers, such as primary account numbers (PANs), to authorize, and to facilitate clearing and settlement of, payment card transactions for credit, debit, stored value and/or prepaid card accounts. The card accounts have standardized payment card account numbers associated with them, which allow for efficient routing and clearing of transactions; for example, ISO standard account numbers such as ISO/IEC 7812-compliant account numbers. The card accounts and/or account numbers may or may not have physical cards or other physical payment devices associated with them. For example, in some instances, organizations have purchasing or procurement card accounts to which a payment card account number is assigned, used for making purchases for the organization, but there is no corresponding physical card. In other instances, "virtual" account numbers are employed; this is also known as PAN mapping. The PAN mapping process involves taking the original Primary Account Number (PAN)(which may or may not be associated with a physical card) and issuing a pseudo-PAN (or virtual card number) in its place. Commercially available PAN-mapping solutions include those available from Orbiscom Ltd., Block 1, Blackrock Business Park, Carysfort Avenue, Blackrock, Co. Dublin, Ireland (now part of Mastercard International Incorporated of Purchase, N.Y., USA); by way of example and not limitation, techniques of U.S. Pat. Nos. 6,636,833 and 7,136,835 of Flitcroft et al., the complete disclosures of both of which are expressly incorporated herein by reference in their entireties for all purposes.

[0052] Some payment card networks connect multiple issuers with multiple acquirers; others use a three party model. Some payment card networks use ISO 8583 messaging. Non-limiting examples of payment card networks that connect multiple issuers with multiple acquirers are the BANKNET® network and the VISANET® network. One or more embodiments are applicable to many other different kinds of payment card networks as well; the AMERICAN EXPRESS® network and the DISCOVER® network are non-limiting examples.

[0053] Still referring to FIG. **2**, and with reference also now to FIGS. **4** and **5**, by way of review and provision of additional detail, a consumer **2002** effectively presents his or her card **150** or other payment device (e.g., presents suitably configured "smart" phone or uses an e-wallet) to the terminal **126** of a merchant **2004**. A mag stripe card **150** and combined terminal **126** are shown by way of example, but are intended to generally represent any kind of payment device and any kind of terminal. The effective presentation can happen directly (user enters a brick and mortar location of a merchant **2004**) or virtually (user logs on to a web site of a merchant **2004** via a browser of a personal computer or the like, or calls on the telephone, and provides card information, or sends a "snail" mail with payment card account information to a merchant). The merchant terminal **126** captures the card account information (for example, by swiping or wireless communication if directly presented; by manual keying or reading data if remote) and forwards same to the acquirer **2006**. Interaction between the merchant and cardholder is outside the purview of the payment card network per se. The payment card network becomes involved at the connection between the acquirer **2006** and network **2008**; the dotted line between points E and F in FIGS. **4** and **5** encompasses the network **2008**. Note generally that points A, B, C, E, and F in FIG. **4** connect to the corresponding points in FIG. **5**; the entire network and associated environment are not amenable to illustration on a single sheet.

[0054] More specifically, the acquirer **2006**, in the more specific example of FIGS. **4** and **5**, has at its premises a payment network interface processor (PNIP **2012**). The Mastercard Interface Processor or MIP is a non-limiting example of a PNIP. In a non-limiting example, the PNIP is implemented on a rack-mounted server. PNIPs are typically located at the edges of the payment card network. In at least some instances, the payment card network of FIG. **2** is a distributed network wherein each acquirer and issuer has at least one PNIP on their premises. Each acquirer **2006** will have a relationship with one or more merchants **2004** and will interface with the merchants' terminals **126** via terminal driver **2014** (an acquirer may also act as an acquirer for themselves as a merchant). Furthermore in this regard, the merchant locations will have terminals where the cards are swiped (or where contacted or contactless devices are presented). The acquirer will employ terminal driver **2014** to interface with those terminals. Terminal driver **2014** is a logical block representing software and/or hardware that allows the acquirer processing platform **2015** to communicate with the terminals of the merchants via TCP, dial up, or the like (TCP/IP interfaces **2016** are shown in the example in the figures). Each merchant will decide what acquirer to use to accept one or more brands of payment cards, and the acquirer will set the merchant up with the appropriate software and/or firmware for the merchant's point of sale devices.

[0055] The acquirer **2006** will present transactions from many different merchants **2004** to the payment card network operator **2008** via the PNIP interface **2012**. The connection between the merchants **2004** and the acquirer **2006** is typically a TCP/IP interface **2016**. The format that the transaction is in when the card is swiped at the merchant **2004** may differ from the format that the transaction is in when actually received by the payment card network operator. The acquirer may convert the transaction into the ISO 8583 format or into a format that is a specific implementation of the ISO 8583 format (e.g., the MASTERCARD CIS (customer interface specification) format). The authorization request message can be an ISO 8583 message type identifier (MTI) 0100 message, for example, sent over the communications interface **2016** between the merchant **2004** and the acquirer **2006**.

[0056] Once the 0100 message is received at the PNIP **2012** of the acquirer **2006**, a series of edits can be performed on the transaction with respect to format, content, and/or context. Furthermore, screening can be carried out to determine whether the message relates to something beyond an ordinary authorization request, referred to as an enhanced service. Enhanced services may be screened for on behalf of one or more issuers **2010** and/or the operator of network **2008** itself. A centralized member parameter system (MPS) **2018** can be provided to house parameters used to drive processing of credit authorization transactions. In one or more embodiments, extracts from the centralized member parameter system **2018** are distributed to all acquirer PNIPs **2012** and issuer PNIPs **2024** on the network **2008** on a daily basis to drive processing of credit card transactions.

[0057] It should be noted at this point that an "ICA" and a "BIN" are employed in BANKNET so that a member can perform card issuing and/or acquiring activities. An ICA or Interbank Card Association is a four to six digit identification assigned by Mastercard for use by a member to uniquely identify activity the member is responsible for. A BIN or Bank Identification Number is a unique series of numbers assigned by Mastercard to a principal member and used as the first six digits of a cardholder account number. Other payment card networks have similar types of numbers, as will be apparent to the skilled artisan.

[0058] In at least some embodiments, the same member parameter extract is sent to all PNIPs and transactions are routed using same. In at least some circumstances, account numbers or ranges of account numbers are used in deciding how to route. In some cases, transactions are routed to an issuer PNIP based on where the account range is "signed in." Issuers send an MTI 0800 sign in request message with either a group ID or account range. The Member ID is pulled from the PNIP port **2038** (discussed elsewhere herein) configuration and transactions from that account range are then routed to the port from which the sign-in request is received. A member ID can be present on ports on multiple PNIPs at an Issuer site—see discussion of FIG. **7** below.

[0059] In one or more embodiments, based on the account range, the parameters in MPS **2018** (or a local extract thereof) will determine how to process a given transaction; e.g., product code, country code, currency code, and the like, including what enhanced services (if any) the issuer has signed up for on a particular account range. That is to say, the messages are parsed and certain fields, including the account range, are examined; the account range is associated with a certain issuer and based on that, the message may be treated differently. Messages may be parsed, and converted into an internal data format so that access can be obtained to all the individual data elements. In one or more embodiments, the account number is used as a key to access the MPS **2018** (or a local extract thereof) and retrieve all the parameters that are appropriate for processing the given transaction. In a non-limiting example, a suitable message parser **2020** (and other programs on the PNIP **2012**) can be written in an appropriate high-level language or the like.

[0060] In an exemplary embodiment, the central MPS **2018** creates extracts once a day that are distributed out to the endpoints on the network (e.g., PNIPs **2012**), as seen at **2022**. These extracts include the pertinent information needed for the PNIP to process the message and determine if it requires any special handling. In some instances, messages are next routed to a central site **2009** for performance of enhanced services. On the other hand, if no special services are required, the message may be routed directly to the issuer PNIP **2024** as seen at **2026**.

[0061] Messages routed directly to the issuer PNIP: In this aspect, the transaction is routed directly to the issuer PNIP **2024** based on the MPS extract **2022**, as seen at **2026**. Every account range will have a unique destination endpoint identified in the parameters (account ranges may be grouped and all members of the account range group may have a common destination endpoint). The member interface refers to the connection between the acquirer processor **2006** and the Acquirer PNIP **2012**. This term also applies to the interface between the Issuer PNIP **2024** and issuer processor **2010**. The connections between and among acquirer PNIP **2012** and issuer PNIP **2024**, acquirer PNIP **2012** and ASPs **2050** (discussed elsewhere herein), and ASPs **2050** and issuer PNIP **2024** are referred to as a network interface onto the payment card network itself. In one or more embodiments, this may be a TCP/IP connection (as seen at **2026**) with customized routing capabilities including group addresses. Normally, TCP/IP addresses refer to a single endpoint. Group addresses may be directed to a group of addresses, and will target any of the computers (e.g., PNIPs) in the group using a variety of protocols. Some use a round robin approach; others may use a first in list approach where the message is always routed to one given computer first and then to a second computer only if the first is not available. Group addressing may be useful, for example, where an acquirer or issuer has multiple PNIPS at the same location for redundancy/fault tolerance. It is also possible to combine the approach and institute a round robin, wherein the addresses within the round robin are first in list group address, or conversely, it is possible to institute a first-in-list, wherein the addresses within the first-in-list are round robin group addresses. These capabilities are useful in case of outages, maintenance, and the like.

[0062] FIG. **6** shows a non-limiting example with four PNIPs **2028-1** through **2028-4**. In a round robin approach, a first message is routed first to PNIP **2028-1**, a second message to PNIP **2028-2**, a third message to PNIP **2028-3**, a fourth message to PNIP **2028-4**, a fifth message to PNIP **2028-1**, and so on. In a first in list approach, all messages are routed to PNIP **2028-1**; if it is not available for a given message, the message is routed to PNIP **2028-2**; if PNIP **2028-2** is not available, the message is routed to PNIP **2028-3**; if PNIP **2028-3** is not available, the message is routed to **2028-4**. Each PNIP **2028-1** through **2028-4** in FIG. **6** could be a single machine or a group of machines addressed by first in list or round robin as discussed just above. In one or more embodiments, the physical network **2026** between PNIPs **2012**, **2024** and the physical network **2030**, **2032** between PNIPs **2012**, **2024** and the central site **2009** is a private Multiprotocol Label Switching (MPLS) TCP/IP network and is not the Internet. Once the issuer's network group address has been determined by the PNIP **2012** (or ASP **2050**), the message is routed to the issuer PNIP **2024**. Once the 0100 auth message arrives at the issuer PNIP **2024**, additional edits are performed to double check and make sure that the message has been routed to the correct location. Furthermore, the member ID is examined, because some issuers may share a single PNIP and it is necessary to determine which of the issuers (members) sharing that PNIP the transaction in question is to be routed to. Each of the issuers sharing the PNIP will have its own port on the member side of the PNIP; the transaction is routed to the appropriate port based on the member parameters. See FIG. **7** where a generalized PNIP **2028** has a network side **2034** and a member side **2036**. Member side **2036** has N ports **2038-1** through **2038**-N to members **1** to N. N is used herein as a generalized arbitrary integer and the value of N in FIG. **9** is not necessarily the same as that of N in connection with elements **2002** in FIG. **2**, for example.

[0063] As seen in FIG. **8**, in some instances, an issuer has multiple PNIP devices **2028** at a single site, with a network-side connection **2034**, and with multiple PNIPs **2028** all connected to the same host system (each has port **1** **2038-1** associated with the same member (issuer)).

[0064] At this point, the 0100 message has been delivered to the issuer **2010**. The issuer **2010** then carries out issuer processing and decisioning (e.g., with issuer processing platform **2040**) based on transaction velocities, open to buy, fraud detection protocols, etc., and provides an appropriate authorization request response, ISO 8583 MTI 0110. There are a number of different possible response codes defined within ISO 8583 and its particular implementations. Each transaction is made up of multiple data elements; the response from the issuer is included in data element **39**. Once the 0110 message is received on the issuer PNIP **2024** from platform **2040** it is parsed and edited for format, content, and context, including validation of DE39 to make sure that it is a valid value.

[0065] It is worth noting that in one or more instances, at every point where a transaction touches a computer of the payment card network, whether it be an acquirer PNIP **2012**, issuer PNIP **2024**, or a special services computer or computers **2050** at the central location **2009** (discussed below), transaction context is preserved. That is to say, before the message is sent on to the next node in the network, a copy is saved in a context manager queue **2042**, **2046**, **2058**, so that when the transaction response MTI 0110 comes back through, the request MTI 0100 can be matched with the response, in order to know how to route the response back to the previous route point. One of the items saved in the context manager queue is the message originator's address, so that it can be used for route-back information. Once the issuer PNIP validation is complete, including format, content, and context edits, the transaction is extracted from the context manager queue **2046** and the route-back address is retrieved, and the 0110 message is then sent back where it came from; in this case, the acquirer PNIP **2012** (or ASP **2050**). The acquirer PNIP **2012** then receives and parses the message and pulls its original request out of its context manager queue **2042**. Note that multiple acquirers may share an acquirer PNIP and it is therefore necessary to know which port on the acquirer PNIP to route the response back to (see discussion of FIG. **7**). Checking the message against the original request in the context manager queue allows the message to be routed back to the correct port.

[0066] Each PNIP **2012**, **2024** typically has many different programs. These can include, for example, a parser/editor **2020**, **2043**; a parameter file manager; a transaction context

manager; a member communications program; a network communications program; and the like. Please note that to reduce clutter, FIGS. **4** and **5** show "MPS extract" **2022**, **2044**; this will typically include the extract itself and the associated parameter file manager which manages obtaining the extracts from MPS **2018**. Similarly, to reduce clutter, FIGS. **4** and **5** show "context manager queue" **2042**, **2046**; this will typically include the queue itself and the associated manager which manages the contents of the queue. In one or more embodiments, there is also a communication program used to communicate between the other programs (inter-process communications) on the PNIP; this is omitted from FIGS. **4** and **5** to avoid clutter.

[0067] Messages in case of Enhanced Services: In one or more instances, a special architecture is used to facilitate delivery of enhanced services (the ASP **2050** in FIGS. **4** and **5** is a non-limiting example). Examples of enhanced services include the Mastercard "inControl" product providing spending controls and/or virtual card numbers. Other examples are loyalty rewards, recurring payment cancellations, and the like. One or more instances do not deploy this complex logic out to the network edge. Furthermore in this regard, the issuer and acquirer PNIPs **2012**, **2024** are referred to as being on the edge because they reside on the customer's premises **2006**, **2010**. There may be over **2000** PNIPs on a typical network. The special architecture used in one or more instances is a central site type architecture associated with location **2009**. At the central site **2009**, certain computers are referred to as authorization services processors or ASPs **2050**.

[0068] On the acquirer PNIP **2012**, when checking the member parameter file for an account range, determine whether the transaction requires enhanced services. If yes, the transaction is routed to the central site ASPs **2050**, which have interfaces to all of the service provider systems—the ASPs do not necessarily provide the services themselves (although they can in some embodiments), but may mediate between the network (e.g., BANKNET) and the actual service providers **2051-1** through **2051**-N. An ASP will typically have connections **2053** to a mainframe **2052** via DB2 connect or other suitable connection. If a transaction is to be enriched with additional data, a database call will be made to the mainframe **2052** to retrieve the information from mainframe database **2054** so that it can be inserted into the transaction before the transaction is forwarded to the issuers. Interfaces can also be provided to a risk management system, a decisioning management system, IN CONTROL, rewards, and the like. Service providers **2051-1** through **2051**-N generally represent any enhanced services, non-limiting examples of which have been given herein.

[0069] A communications layer **2056** is used to communicate with the service providers in one or more embodiments, a non-limiting example of a suitable implementation is the IBM MQ series. The 0100 message may be sent to the service providers, optionally encapsulated inside a special "enhanced services" (ES) header that wraps the message with any additional information required to fulfill the service. The service provider sends a response. The ASP takes the response and enriches the 0100 transaction with the service response, and then sends the entire package on to the issuer PNIP **2024**. Some enhanced services are processed on the request messages (0100) and others are processed on the response messages (0110). Once the response message is processed on the ASP, the original message will be pulled from the context manager queue **2058** on the ASP to determine the appropriate acquirer PNIP **2012** to route the message back to. From there, the acquirer PNIP will behave just as in the "Messages routed directly to the issuer PNIP" case discussed above. Some embodiments of the special architecture use an Enterprise Service Bus to mediate and facilitate some of the services **2051**. For example, the In CONTROL service can be accessed via an instance of an Enterprise Service Bus.

[0070] Entry of Data into the Data Warehouse: In one or more instances, every transaction that flows through the issuer PNIP **2012**, acquirer PNIP **2024**, and/or ASPs **2050** is logged at every point by writing log records. Multiple times a day (e.g., six), a global file transfer system **2059** pulls the logs off each node and collects them into a support files system **2060** on the mainframe **2052**. The log files are parsed and collected into a general daily file. The general daily file is scrubbed and modified to create a consolidated file on the mainframe which is then pulled into the data warehouse **2062**, where additional data manipulation and scrubbing are performed before the transactions are stored. The data warehouse **2062** is located at an intermediate node (location **2009**) connected to the PNIPs of the acquirers and issuers **2012**, **2024**. By way of clarification, in one or more embodiments, the node **2009** is directly connected to the PNIPs **2012**, **2024** but the data warehouse is not directly connected to the **2012** and **2024** devices; rather, data flows through GFT and SF systems **2059**, **2060** and ends up in the data warehouse. Data warehouse **2062** should be distinguished from a data warehouse **154** that might be maintained by an issuer.

[0071] Clearing and Settlement: One or more instances employ a clearing and settlement system **2074**. In clearing, via global file transfer **2059**, acquirers submit clearing files in an appropriate message format (in a non-limiting example, Integrated Product Messages (IPM) format). The files contain, from the acquirers' perspective, what they believe they should be paid for. In one or more instances, the authorization does not actually move any money; the authorization only validates that the cardholder is a valid cardholder recognized by the bank, which will honor payment to the merchant for the goods or services. For example, in a typical restaurant visit, the card is swiped for the receipt amount but then a tip is added. The clearing message will have the actual food amount plus the tip. In one or more instances, the clearing does not actually move the money; it merely resolves the actual amounts. The settlement system actually initiates movement of the money. Furthermore in this regard, the settlement system actually tells the banks how much money to move but does not actually move the money. Within clearing, processes include dispute resolution, chargeback, and the like. During clearing, files are sent from the acquirers to the payment card network; the payment card network, using clearing and settlement system **2074**, then takes the files and splits them and sorts them by issuer. Response files are then received from each issuer, and these response files are again split and re-sorted back to the correct acquirers. Eventually, data flows into the settlement system and money is moved. Thus, at a high level, the auth request and auth request response are in real time, and the clearing and settlement are in a batch mode.

[0072] By way of review and provision of additional detail, in at least some instances, in a batch mode, clearing is initiated via an ISO 8583 MTI 1240 message having a

DE24 function code value of 200 for a first presentment. Once this message is obtained from the acquirer, the payment card network, using clearing and settlement system **2074**, will undertake syntax edits, format edits, content edits, and context edits (typically applied to every transaction). If those edits are passed, the interchange and fees associated with the transaction will be calculated. Based on the calculations, the message may also be enriched with additional information before being passed on to the issuer. The settlement amount is then determined. Within the clearing cycle, the amounts of money due to each given member (e.g., issuer or acquirer) are accumulated, and these are summed up into a settlement file which is forwarded in due course.

[0073] Cryptographic aspects: Consider the concepts of data at rest and data in motion. An example of data at rest is the log files that actually reside on the PNIPS themselves—configuration information containing card numbers or personally identifiable information (PII). In one or more embodiments, all sensitive data at rest is encrypted before being written to disk. Data in motion refers to data actually moving over a transmission medium (e.g., wires, coaxial cable, fiber optic cable, RF link). All PCI-sensitive data (PCI Security Standards Council, LLC, Wakefield, Mass. US) is encrypted, whether written to disk or being sent over a network. In at least some instances, internal links within the premises of the acquirers and issuers are not encrypted since it is assumed that the customer premises are a physically secure facility relying on physical security of the hardware. On the other hand, in at least some instances, external links (e.g., links **2026**, **2030** and **2032**) are all encrypted for both authorization traffic and bulk file transfers.

[0074] One or more embodiments will have interface(s) **2068** to other brands of payment card processing network. For example, a MASTERCARD branded payment card processing network may have interfaces to networks such as AMERICAN EXPRESS, VISA, JCB, DISCOVER, and the like. Suitable translation layers can be provided to intermediate between MASTERCARD (or other) format and formats used by other networks, as appropriate. In one or more embodiments, interfaces **2068** to other payment networks are provided via a machine, located at **2009**, but generally analogous to an Issuer PNIP **2024** with added mediation layers loaded as required by other payment network formats. Some merchants may only have a single interface to, e.g., the MASTERCARD network—all transactions from that merchant may be routed to MASTERCARD, regardless of what card was used—MASTERCARD will process those transactions and route them out to the appropriate networks.

[0075] While payment card networks have generally been used as described with regard to FIGS. **1** and **2**, recently, Mastercard MONEYSEND (mark of Mastercard International Incorporated, Purchase, N.Y., US) money transfer services have provided a new dimension. A funding transaction moves money from the sender (customer) to the Originating Institution (the financial institution providing the money transfer service); that transaction can be initiated through a MONEYSEND application program interface (API). The sender can fund the transaction using a Mastercard card account or other branded card account that the Originating Institution accepts; from a bank account; or with cash. A Payment Transaction transfers funds from the Originating Institution, via the Mastercard Network (e.g., BANKNET), to the payment card account identified by the recipient at the Receiving Institution. Funds can be transferred to a Mastercard® card, Debit Mastercard® card, and the like (marks of Mastercard International Incorporated, Purchase, N.Y., US). Such transactions are a non-limiting example of what can be more generally referred to as special payment transactions.

Exemplary Mobile Device

[0076] FIG. **9** is a block diagram of an exemplary tablet computing device, netbook, "Ultrabook" or other subnotebook, laptop, mobile electronic device, or smart phone **800** or the like. Unit **800** includes a suitable processor; e.g., a microprocessor **802**. A cellular transceiver module **804** coupled to processor **802** includes an antenna and appropriate circuitry to send and receive cellular telephone signals, e.g., 3G or 4G. In some cases, a Wi-Fi transceiver module **806** coupled to processor **802** includes an antenna and appropriate circuitry to allow unit **800** to connect to the Internet via a wireless network access point or hotspot. The skilled artisan will appreciate that "Wi-Fi" is a trademark of the Wi-Fi Alliance and the brand name for products using the IEEE 802.11 family of standards. In some cases, a Bluetooth transceiver module **829** coupled to processor **802** includes an antenna and appropriate circuitry to allow unit **800** to connect to other devices via the Bluetooth wireless technology standard. In some cases, an NFC transceiver module **831** coupled to processor **802** includes an antenna and appropriate circuitry to allow unit **800** to establish radio communication via near-field communications.

[0077] Operating system (OS) **827** orchestrates the operation of unit **800**. Apple's iOS and Google's Android are non-limiting examples of suitable operating systems.

[0078] Touch screen **810** coupled to processor **802** is also generally indicative of a variety of input/output (I/O) devices such as a keypad, another type of display, a mouse or other pointing device, and so on, all of which may or may not be present in one or more embodiments. Audio module **818** coupled to processor **802** includes, for example, an audio coder/decoder (codec), speaker, headphone jack, microphone, and so on. Power management system **816** can include a battery charger, an interface to a battery, and so on. Memory **812** is coupled to processor **802**. Memory **812** can include, for example, volatile memory such as RAM, and non-volatile memory such as ROM, flash, or any tangible computer-readable recordable storage medium which stores information in a non-transitory manner. Processor **802** will typically also have on-chip memory.

[0079] In some cases, fingerprint scanner **837** is coupled to processor **802** for biometric authentication purposes. An appropriate corresponding software application (not separately depicted) may reside in memory **812** in some instances. A digital camera **839** is coupled to processor **802**. Camera **839** can optionally be used in conjunction with a facial recognition application **835** in memory **812** for biometric verification. A microphone in audio module **818** can optionally be used in conjunction with a speaker recognition application **833** in memory **812** for biometric verification; a suitable acoustic front end can be provided.

[0080] A GPS receiver module **899** coupled to processor **802** includes an antenna and appropriate circuitry to allow device **800** to calculate its position by precisely timing the signals sent by GPS satellites high above the Earth. Corresponding software resides in memory **812**.

[0081] Memory **812** can also include, for example, a stored PIN for comparison with a PIN entered via touch screen **810**; extracted facial features from the legitimate owner of the phone for comparison with facial features extracted from a picture taken by camera **839**; extracted fingerprint features from the legitimate owner of the phone for comparison with fingerprint features obtained from a scan carried out by scanner **837**; and/or extracted voice features from the legitimate owner of the phone for comparison with voice features extracted from a voice sample obtained from a microphone in audio module **818**. Note that elements in FIG. **9** are shown connected directly to processor **802**; however, one or more bus structures can be employed in one or more embodiments. Furthermore, elements shown as implemented in software may be implemented at least in part in hardware for speed, if desired.

[0082] Browser program **897** in memory **812** deciphers hypertext markup language (html) served out by a server such as system **500** (discussed below) for display on screen **810** or the like.

[0083] Application (mobile app) **845** in memory **812** can represent a variety of applications such as a mobile banking application as discussed below.

[0084] Every instance need not necessarily have every feature depicted in FIG. **9**.

Haptic Interaction and Related Aspects

[0085] Referring to FIG. **10**, in a first step of a first embodiment, the merchant has a location **1015** on its web site **1013** that it wants users to engage with; e.g., a "buy" or "signup" button or the like represented by the "Buy/Confirm" button **1015**. In order to make the location of that button known, a site map is submitted to the rules engine **1011** as illustrated by arrow **1001**, or some other method of identifying the location to the rules engine is employed. The rules engine **1011** is then provided with one or more rules setting forth what should happen when a peripheral (e.g., the haptic-enabled peripheral **1019**) encounters this area of the screen (i.e. proximity of button **1015**). The rules specify that the peripheral should behave in a certain way. The rule(s) can be specified to the rules engine by, for example, the merchant, the consumer, the consumer's bank, and/or another appropriate individual or entity.

[0086] In a second step illustrated by arrow **1002**, the peripheral such as **1019** senses the merchant's site **1013**; for example, the individual whose finger **1017** is shown interacting with the peripheral **1019** is on a web page (merchant site **1013**). For example, the user is using his or her finger to guide a cursor around a screen. Data returned includes the coordinates of the cursor's location on the screen. When the page first loads, it will send the URL to the rules engine **1011**. At least a portion of the page will be loaded into the rules engine; the engine will ignore the page's content and focus on the special tags used to mark the page up. In some instances, the engine creates a map of what is on the page. Based on the coordinates of where the person is at any point in time, the engine will be able to provide feedback to the glove or other peripheral indicating, for example, that, based on the cursor being located at X=tic 200, Y=tic 2; the desired button **1015** is below the current location. The feedback provided to the glove or other peripheral indicates that the cursor should be moved in the desired direction towards the button **1015**.

[0087] In one or more embodiments, on page load, the rules engine **1011** receives the URL for the site **1013**; interprets the markup to prepare/obtain a map of the page; keeps track of the coordinates of where the person is on the page; and then provides feedback to the peripheral to guide the user to the next desired location. Thus, in step **1001** load, the URL of site **1013** into the rules engine **1011** and carry out one-time mapping (or load pre-existing map). Step **1003** represents the provision of feedback regarding how the user is moving on the page. As the user navigates the screen, the rules engine keeps track that the user is at different locations. When the user initially wears the haptic-enabled peripheral, he or she can initially move the cursor to a predetermined location such as the top left-hand corner or bottom right-hand corner of the screen. Once the peripheral gets its bearings, it keeps track of motions from that point onward, so it knows the user has moved down, up, etc.

[0088] By way of clarification, while the peripheral **1019** will move, in one or more embodiments the page casts back the location of the cursor. The rules engine does not necessarily need to know where/how the peripheral is moving per se; it needs to know, rather, where the cursor is moving on the screen based on the glove/peripheral action. For example, if the user drops the glove or other peripheral **1019** down to his or her side, the mouse cursor may move to the bottom of the screen and stop there. When the user moves his or her hand back up again, the mouse cursor moves back up. Thus, step **1001** represents when the merchant site **1013** first loads on the user's device; data flow **1003** is from the merchant site to the rules engine, to update cursor location.

[0089] It will be appreciated that step **1001** can include loading and/or building a site map. In some instances, a site map can be prepared during a registration phase, before the person navigates to the site. In other instances, the map is prepared by engine **1011** the first time the page loads. The rules engine may keep a database **1097** of maps based on pre-registration and/or prior construction. When the page is loaded, one of the tags may call out to the rules engine to load the map of the page in question. Thus, in one or more embodiments, **1001** is called at page load. In some instances, there is a pre-registration phase during which the rules engine talks directly to the merchant without the consumer's computer. Then, when the consumer navigates to the site, the consumer's computer sends the URL to the rules engine, which determines that it has prior knowledge of that URL. The peripheral then sends its coordinates to the rules engine. Again, when the page loads, its URL is sent to the rules engine, which can either build a map there "on the spot" or can access a map previously cached from a registration (or previous construction). In at least some cases, the peripheral does not directly communicate with the rules engine—communication is one-way as shown at **1004** with the engine directing the peripheral where to guide the user.

[0090] Data flow **1003** thus shows the merchant site (actually its rendering in the browser of the use's computer) updating the rules engine with the current position of the user's cursor. Furthermore in this regard, the user's computer communicates with the web site, and the web site is rendered on the user's computer by the user's web browser. Thus, it is essentially the user's browser on the user's computer that is aware of what the cursor's coordinates are. It is not necessarily required to go back to the merchant's server to talk to the rules engine; interaction can be directly from the user's browser to the rules engine. In effect, the

browser is making a call to a remote rules engine. The browser sends the user's cursor location to the rules engine, which sends feedback to the peripheral telling the peripheral to urge the user to the desired screen location.

[0091] Thus, by way of review, data flow **1001** represents the following:

[0092] 1. initial registration of merchant **1013** with entity providing rules engine **1011**, without involving user, to create site map, followed by retrieval of site map by rules engine **1011** when user loads page into his or her browser; OR

[0093] 2. rules engine **1011** creates site map when user first loads page into his or her browser (merchant is cooperating however by embedding appropriate codes in the site html).

[0094] Some embodiments could use a mixture of (1) and (2) above; for example, some web sites could pre-register and for others, the site map could be developed on the fly when the page first loads.

[0095] Furthermore, data flow **1003** represents the subsequent interaction between the web site rendered in the user's browser, and the rules engine; including where the user is on the screen corresponding to the web site; the rules engine knows how to guide the user via the peripheral, as seen at **1004**.

[0096] Note that some X Box controllers and gaming mice have the ability to vibrate. However, they may not have the fine guidance capability of a haptic glove or the like. In some embodiments, peripheral **1019** provides a sensation of pressure above, below, left, or right to actually guide the user's hand. Any appropriate kind of haptic feedback can be employed in one or more embodiments.

[0097] Peripheral **1019** has a device driver **1099**. The peripheral will be connected to the user's machine by, for example, a USB cable, Wi-Fi, Bluetooth, or the like. The machine will "think" that it is talking to a mouse. Essentially, the user's hand movements will be reflected by movement of the cursor. For all intents and purposes, the machine merely "thinks" that it is connected to some kind of pointer device; it just so happens that in one or more embodiments, the pointer is a haptic device; e.g., haptic-enabled glove, pen, tablet, mouse, etc. The device driver **1099** has a channel built in for communication with the rules engine **1011**. When a rules-enabled web site loads up into the browser of the user's computer, the rules engine "knows" that it needs to communicate with the device driver **1099** of peripheral **1019**.

[0098] More broadly, both "push" and "pull" models can be employed. In a "push" model, the rules engine **1011** communicates with the device driver **1099** on the user's machine to provide the needed feedback. In a "pull" or "polling" model, the peripheral polls the rules engine via the peripheral's device driver and can be told that "there are no rules for this page" or alternatively "yes, there are rules for this page." The peripheral can constantly poll and every time it asks the rules engine "what do I do next," the rules engine looks at its map, sees where the pointer is located, and sends back the appropriate feedback.

[0099] In one or more embodiments, when a new page loads, the first thing it does is to go to the rules engine and see if there are any rules for that page. If yes, feedback is provided and it continues polling. If no, stop polling until a new page loads. The level/frequency of polling can be user-configurable in one or more embodiments, via configuration of the device driver.

[0100] One or more embodiments include a database **1097** in the rules engine; this database or some other kind of data structure determines whether there are rules for a given URL. As noted, in the "poll" approach, the peripheral carries out a poll via the device driver. The rules engine **1011** then performs a simple query on its own database **1097** to see if it has an entry for the web site in question. If there is an entry, then the logical flow proceeds to determining what feedback to send to the device driver based on the current cursor position. Database **1097** or another suitable data structure includes the information: (a) are rules available for a given URL; and (b), if so, what are the rules for the different cursor locations. The rules engine **1011** can reside in the cloud and be managed by an entity such as Mastercard International Incorporated or other operator of a payment network or similar entity, or could be a software development kit (SDK) dropped into the device driver, which actually sits on the person's machine.

[0101] In this latter aspect, the user's machine is equipped with a haptic glove or other haptic peripheral **1019** and a special device driver is installed, which helps the peripheral communicate with the user's computer. In some embodiments, part of what is installed is a rules-based haptic feedback SDK **1098**. Thus, the rules engine **1011** can be hosted on the person's device and it can access a database **1097** to find out what to do next, or the rules engine may exist in the cloud, but it will still talk to a database **1097** to find out what to do next. It is recognized that the peripheral **1019** is pointing to an area that is specified on the site, which is meant to cause the peripheral to interact in a certain way.

[0102] In the step illustrated by arrow **1003**A, additional data is brought into the engine **1011**; e.g., from cloud **1021**. In a non-limiting example, this additional data could include, for example, the consumer's bank indicating that the consumer should not purchase anything over $1000 because the consumer's monthly budget would be exceeded. In the step illustrated by arrow **1004**, the appropriate instructions are sent to the peripheral **1019** from the rules engine, based on the appropriate rules, in order to cause feedback (e.g. haptic feedback) by the peripheral to guide the user, as directed by the site and/or the rules engine.

[0103] Regarding cloud **1021** (and cloud **1121** mentioned below), cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction, as the skilled artisan will appreciate from, for example, Peter Mell and Timothy Grance, NIST Special Publication 800-145, The NIST Definition of Cloud Computing, September 2011, expressly incorporated herein by reference in its entirety for all purposes.

[0104] "Site haptics" refers to site-directed physical feedback; the rules or instructions specifying what the peripheral should do in certain locations on the screen, possibly also conditioned on other data. For example, in this region of the screen, do nothing; in this region of the screen (say adjacent button **1015**) provide a stimulus to attract or repel the user, as the case may be. The latter behavior might be conditioned on the aforementioned other data; i.e., if adjacent button

1015 but consumer has not exceeded monthly budget do nothing or guide the user to button **1015**; if adjacent button **1015** and consumer has exceeded monthly budget, repel user from button **1015**. Thus, appropriate feedback can be sent to the consumer thorough the peripheral **1019**, thereby guiding the consumer towards or away from button **1015**, as indicated by arrow **1005**.

[0105] So, for example, if the rules engine **1011** indicates that the budget is exceeded, the site haptics sent in step **1004** indicate to the haptic-enabled peripheral **1019** that it should repel the user from the vicinity of button **1015**. Alternatively, under different appropriate circumstances, the system can provide a stimulus to guide the consumer to push the button. The user guidance is illustrated by arrow **1005**. Guidance may be appropriate, for example, for the visually impaired, for minor children, and the like. In the latter case, a child could be encouraged to buy a healthy snack or read a book rather than buying candy or playing a video game. Thus, non-limiting examples of things to which the consumer could be guided include offers, items of interest, contextually relevant items, and the like.

[0106] Examples of suitable virtual reality gloves include the Manus VR Glove, which is a high-end data glove that brings intuitive interaction to virtual reality, and is available from Manus VR, Eindhoven, Netherlands; and the "VRgluv" virtual reality glove available from VRgluv, LLC, Atlanta, Ga., USA. The non-limiting example in FIG. **10** shows a haptic-enabled peripheral enclosing a user's finger and functioning as a pointer. This represents, for example, an active portion of a virtual reality glove or the like. Other embodiments can use different approaches. Game controllers such as X Box and Play Station controllers may provide suitable haptic feedback in some instances. Wearable device such as an Apple Watch can provide a haptic "jolt."

[0107] FIG. **12** shows a cross-section of a single-finger peripheral **1201** (also representative of one finger of a multi-finger peripheral) suitable for one or more embodiments. Four actuators **1203-1**, **1203-2**, **1203-3**, and **1203-4** (e.g., piezoelectric actuators, linear resonant actuators (LRAs), inflatable bladders, or the like) are located at 0, 90, 180, and 270 degrees respectively on single-finger peripheral **1201** (e.g., embedded in a rubber or polymer finger). Controller **1205** receives commands from a device driver and translates same into electrical or fluid signals to cause the appropriate actuator to vibrate or inflate. If desired to urge the user down, have an unpleasant vibration or pressure on top actuator **1203-1** (and vice-versa **1203-3** urges up); if desired to urge the user right, have unpleasant vibration or pressure on left actuator **1203-4** (and vice-versa **1203-2** urges left).

[0108] Other approaches can be used in different embodiments. For example, in some embodiments, the consumer may wear a full haptic glove; may interact with a screen or with augmented reality using a virtual (VR) or augmented reality (AR) headset, goggles, glasses, projection screen, or the like. Embodiments are thus not necessarily limited to desktop- or laptop-only experiences. The use of hand(s) and glove(s) with haptic feedback is a non-limiting example of sending a signal to the user encouraging the user to buy, drawing the user's attention to an action button, or alternatively, warning the user not to press the button because the user cannot afford the purchase, or for some other appropriate reason.

[0109] In an alternative embodiment, a smart phone (e.g. **800**) and mobile banking app (e.g., particular instance of a mobile app **845**) are employed. The smart phone vibrates and/or sends a ring tone to warn the user not to buy something; for example, a rules-based warning is provided that warns the user that the potential purchase is over budget, or is provided to warn a parent that his or her child is trying to buy something. Thus, embodiments are not limited to haptic feedback, and the notification from the rules engine **1011** could be delivered in an alternative manner such as a ring tone or vibration on smart phone. Broadly, another device could be used to give feedback, not necessarily haptic feedback. For example, a smart phone could be placed on a stand next to, or clipped onto the side of, an individual's monitor, and the phone's screen could be controlled to change to very strong contrasting colors. Suppose a visually impaired person is looking at the main computer screen and has difficulty understanding it. Suppose it is desired to guide the visually impaired person down and to the right. A contrasting "blob" appears on the middle of the smart phone's screen and moves down to the bottom right-hand bottom corner. It keeps doing this until the visually impaired user moves the cursor to the appropriate spot, after which the "blob" moves back to the middle of the smart phone's screen. Audio guidance could also be used; for example, as the user moves the cursor towards the correct spots, beeps become louder and/or faster. Thus, some embodiments use feedback other than haptic feedback.

[0110] However, haptic embodiment(s) are advantageous, for example, for the visually impaired, and even for those with full visual abilities. In some instances, even before giving the user a budgetary or other warning, it is desirable to draw the user's attention to the fact that there is an action button or the like (e.g. **1015**) on the screen. Embodiments can also be used to call attention to a "special offer" or "members only" button.

[0111] Thus, embodiments that do employ haptic feedback via a haptically-enabled peripheral are not limited to fingertip action; other peripherals such as gloves and the like can be employed. Peripherals can be attached to computers, portable electronic devices, mobile phones, or the like, and in an appropriate manner provide the user tactile or other haptic feedback.

[0112] One or more hapticly-enabled embodiments go beyond the provision of an alert to provide tactile sensations to pull or push a user away from/towards a button such as **1015** or the like. In another aspect, tactile feedback can be employed with a smart phone (e.g. **800**) or other device by providing a sense of pressure or vibration on the user's hand as he or she navigates around a screen (e.g. touch screen) or augmented reality (AR) environment or virtual reality (VR) environment. In this aspect, the user wears a haptic glove with an open fingertip or with a special fingertip that works with the touch screen. For example, one or more fingertips of the haptic glove, or even the entire glove, can be made from a special conductive micro-fiber woven into a glove liner, to bridge the conductive gap your gloves create between the user and his or her device. The user's location on the screen is sensed based on his or her fingertip, in the usual manner, and conveyed to the device driver and rules engine for control of the haptic glove.

[0113] Hot or cold sensations or tingling sensations are other examples of ways to signal to a user. The tingling may be provided for both "hot" and "cold" but the user may be

looking at a picture of a flame or an ice cube and may perceive "hot" or "cold" based on the tingling and visual cue. In another aspect, the haptic feedback may be generated at a sufficient intensity to create friction and thus heat.

[0114] It is worth noting that Mastercard International Incorporated currently has a service referred to as Mastercard In Control, which provides real-time email and mobile app alerts to inform the cardholder of where and how his or her Mastercard credit cards are being used. Such alerts give the cardholder immediate spending insights and help safeguard the cardholder against fraudulent activity. The cardholder can be notified, for example, when purchases exceed a certain amount; when Internet purchases are made; or when a card is being used outside of the United States or other jurisdiction of interest.

[0115] While a highly useful technology, the In Control service generally provides an alert after a purchase has already been made, or may simply decline a purchase if an attempt is made to carry out a purchase over a certain amount. That is to say, in using the In Control service, the user might actually select a button such as a buy/confirm button, causing the merchant to dispatch, via its acquirer, into an ISO 8583 payment card network, an ISO 8583 0100 authorization request. This request would be intercepted by the In Control service, which would cause an ISO 8583 0110 authorization request response to be returned with a "decline" (even if the cardholder had sufficient open-to-buy balance). In contrast, one or more embodiments of the invention warn the user before the purchase is attempted, i.e., before any ISO 8583 0100 or similar message is even sent. For example, when navigating to an order confirmation area, the peripheral used for the navigation reaches out to the rules engine, and feedback is provided before the order is placed.

[0116] Still referring to FIG. **10**, merchant site **1013** can be located on the merchant's server or on the server of a hosting service; the URL for the site is loaded into the user's browser. The rules engine **1011** could be hosted by an entity such as Mastercard International Incorporated. In some instances, such an entity could offer the rules engine as a service like IN CONTROL technology to apply card controls (or Spend Controls and Spend Alerts platform). In this aspect, referring now also to FIG. **13**, the rules engine **1011** could be hidden behind a rules service **1095** (e.g. web service) which is in turn hidden behind an API **1093**. An SDK **1098** could be embedded inside the haptic device's device driver **1099**. This SDK, in this aspect, is a thin layer that talks back to the API **1093** to interrogate the database **1097** behind the service **1095** and come back with an appropriate response. One or more embodiments can be implemented as a traditional API-delivered service, similar to In CONTROL, installments, etc. See discussion of **2050**, **2051**, **2056** above but note that one or more embodiments operate before an authorization request is sent into the payment network.

[0117] In some cases, an issuer or a merchant or the like could register the web site **1013** and the device (peripheral) manufacturers could register the devices; the rules and locations could be set up; and the entity receiving the registrations (e.g. an entity such as Mastercard International Incorporated) provides the rules engine as a service. A peripheral developer could be encouraged to register so as to obtain required security codes and keys to access the API and could modify or build their own device driver. A different party or parties could provide the rules engine **1011** in other embodiments. For example, the developer of peripheral **1019** could host the rules engine **1011**.

[0118] For the avoidance of doubt, references to "Mastercard," "an entity such as Mastercard International Incorporated," and the like, unless expressly stated to be limited to Mastercard, are intended to be exemplary of an operator of a payment card network, as will be appreciated by the skilled artisan from the context, whether or not qualified by words such as "or other operator"; in some embodiments, such an entity may also host the rules engine **1011**, **1111**.

[0119] It should be reiterated that in one or more embodiments, steps are taken before an ISO 8583 0100 auth request (or analogous auth request) is ever sent into BANKNET (or another payment card network).

[0120] One or more embodiments are not limited to commerce. For example, some embodiments pertain to access to a members-only area on a web site or in a game (via a button analogous to **1015** or the like).

[0121] In one or more embodiments, the rules engine **1011** is programmed to know where the button (such as **1015**) is and what actions are to be taken when the user navigates in the proximity of the button **1015** or the like. In one or more embodiments, peripheral profiles are stored in engine **1011**. In this regard, a given peripheral may have certain rules associated with it that should be recognized by the rules engine. Different peripherals will typically require different types of feedback. For example, the rules engine may give a general instruction "move hand down and to the right" and then the peripheral profile will have the information about how to implement that type of motion on the peripheral in question. In some embodiments the profiles are also customized based on user preferences; e.g., how strong to vibrate. This typically requires an identification login to determine who the user is so that the customization can be applied, or alternatively, the customization could be at the level of the local SDK device driver (i.e. configurable via a dashboard as opposed to re-coding; intensity/duration of vibration).

[0122] In one or more embodiments, there are profiles associated just with the peripheral—the peripheral works in this way, can provide this kind of stimulus and needs this kind of command. There is the option of further personalizing to the user; e.g., if accessing a dangerous website, want a continuous uncomfortable vibration; if being guided around a safe web site, want two-second gentle vibration. Indeed, some embodiments have three levels of customization: (1) turn rules on/off, e.g., only want notice of fact at a dangerous web site, turn other warnings off; (2) preferences around how rules are interpreted e.g. intensity and duration of vibration; (3) comfort preferences—normal vibration to indicate direction but no vibration should last longer than two seconds.

[0123] In one or more embodiments, the site map that the merchant (optionally) provides to the rules engine in step **1001** may include, for example, the html for the web page of merchant site **1013**. The rules engine then interprets the html and turns it into appropriate code or the like that maps to the site haptics.

[0124] The haptic-enabled peripheral **1019** has two roles in one or more embodiments: (i) providing direction/guidance to the visually impaired and/or (ii) warning a user

regarding click bait/phishing/unsafe sites and the like. This latter aspect may involve more subjectivity in determining when to issue a warning.

[0125] For an augmented reality (AR) environment, or for moving a pointer around a screen on a desktop, the user uses his or her hand and/or finger(s). Once the rules engine builds the map of where the button such as **1015** is on the page, it can interpret that map to determine when the user has moved over that particular button. This approach makes it easy for merchants to adopt the system, as opposed to requiring building a template or employing pseudo code to indicate where the button is. The rules engine **1011** can interpret the html and determine where the button is. In some embodiments, the entity that develops the web page is advised to tag the button in a certain way in the html. The rules engine then works out the button's position from the html. Once it is known where the button is located, the html can be turned into a map that makes sense for the site haptics. In this scenario, the merchant cooperates with the entity providing the rules engine **1011** to help develop a good rules engine.

[0126] Referring now to FIG. **11**, in another aspect, the merchant site **1113** does not communicate/cooperate with the rules engine **1111**; i.e., does not provide engine **1111** with a site map. This embodiment can be used, for example, to protect against a fraudulent, compromised, virus-infested, untrusted, and/or otherwise unsafe site. In step **1101**, the user browses to the site **1113** using a browser program interacting with peripheral **1119**. Appropriate details (e.g., site, merchant, category, product(s) in basket) are transmitted to the rules engine **1111**. In step **1104**, the engine **1111** responds to the peripheral with appropriate instructions to cause feedback based on the received details; e.g., BAD/AVOID or GOOD/GO. As indicated at step **1105**, the decision may be based on additional data, (e.g., budget) such as from cloud **1121**.

[0127] The skilled artisan will appreciate that other entities watching a user's browser traffic typically warn that a site is not safe, rather than the site itself—e.g., anti-virus software **1187**, web browsers themselves **1185**, web browser plug-ins **1183**, firewalls with appropriate settings **1181**, and the like carry out web site danger monitoring at **1189**. In one or more embodiments, these entities are integrated into the local device SDK **1198**. Instead of or in addition to popping up a message on the screen to indicate that the site is not safe, they will make a call to the local device. They will discover that the device driver is present, make the call into an appropriate API that says "warn user," and this causes the appropriate warning to the user. In one or more embodiments, there is a direct integration with the entity providing the warning: the browser itself, a browser plug-in, anti-virus software, or firewall. These entities typically contain rules for warning about certain sites. An entity such as Mastercard International Incorporated (or other entity) could offer a plug-in for the device driver of the glove or other haptic peripheral, to allow any of these third parties to provide the physical feedback or warning in this manner. Thus, in the first embodiment of FIG. **10**, the merchant is cooperative (by providing a site map ab initio and/or tagging the html for the site so the rules engine can generate the map) while in FIG. **11** the merchant or other web site operator is not cooperative/compliant and the warning is provided by a third party. In some embodiments, a site is added to the warning list by a provider of anti-virus software or similar third party. Thus, in one or more embodiments, anti-virus software **1187**, web browsers themselves **1185**, web browser plug-ins **1183**, and/or firewalls with appropriate settings **1181**, and the like, carrying out web site danger monitoring **1189**, initiate the rules to send the warnings to the user. Note that in the embodiment(s) of FIG. **11**, buy/confirm button **1115** may or may not be present because this aspect relates less to a particular action on the page and more to the entire web site being dangerous per a third party component.

[0128] In step **1106**, the peripheral **1119** provides appropriate haptic feedback to finger **1117** of the user. For example, the haptic feedback may create a significant buzzing sensation or the like if the user navigates to a site that is deemed unsafe. This warns the user not to activate buy/confirm button **1115** and/or to navigate away from the site and possibly even initiate a virus and/or malware scan. For example, the haptic peripheral may direct the user to locate the mouse pointer at the icon for a virus scan application.

[0129] In the embodiment just discussed with respect to FIG. **11**, the merchant has not set up any rules with engine **1111** and an entity such as an anti-virus provider or the like warns the user by providing feedback, using peripheral **1119**, regarding the site to which the user has navigated.

[0130] In FIG. **11**, elements **1197**, **1199** are analogous to elements **1097**, **1099** in FIG. **10**.

[0131] In some instances, the embodiment of FIG. **10** may be commerce-focused, while that of FIG. **11** may be appropriate for any kind of web site. The engine **1111** could be implemented, for example, by an entity that monitors web sites, such as a browser provider; via anti-virus software; via a plug-in that a user downloads to his or her browser (like a popup blocker) to warn the user that the site might be unsafe; or the like.

[0132] Thus, some aspects of the embodiment of FIG. **10** are directed to guiding the consumer around a web site. For example, a visually impaired individual is assisted in navigating a web site, and even someone who is not visually impaired will be able to navigate the **1013** site more efficiently. In some embodiments, peripheral **1019** creates the feeling of a hard surface that the user is pressing against, with certain places he or she can get through and certain places he or she cannot get through. Thus, in essence, one or more embodiments create a virtual physical funnel to direct the consumer to, and/or away from, one or more areas of a site.

[0133] Thus, one or more embodiments illustrated in connection with FIG. **11** can provide guidance such as "yes you should buy/no, you should not buy" or provide feedback on the entire site, i.e., whether it is safe. One or more such embodiments may be particularly helpful for the visually impaired but are also useful for those with unimpeded vision. Thus, aspects of the embodiment depicted in FIG. **11**, where the merchant site or other site does not voluntarily provide a map to the rules engine **1111**, can be used to provide guidance to an individual to confirm that a purchase is advisable or inadvisable, or even prior to the putative transaction proceeding that far, providing feedback about the entire site, such as whether the site itself is safe or the user should navigate away immediately without further browsing. This aspect is also appropriate for both the visually impaired and those with unimpeded vision. The aspect of warning a user away from a potentially dangerous web site is applicable to both merchant/commerce sites and other kinds of sites. For example, the peripheral **1119** may guide the user to move the pointing device to the familiar upper

right-hand corner "X" to close the browser window displaying the dangerous web site and may subsequently guide the user to engage in a remediation action, a non-limiting example of which is to open an anti-virus or malware detection program and initiate a scan—the user may be prompted to move the pointing device to open a virus scan and/or malware detection program.

[0134] In any of the embodiments, a number of techniques can be utilized to implement the rules engine **1011**, **1111**. Some embodiments simply employ IF-THEN-ELSE statements rendered in a high-level language and compiled or interpreted as appropriate. Other embodiments can employ, for example, pattern matching. With regard to pattern matching, in one aspect use a scraper or crawler program or the like to scrape publicly available web sites, have human experts annotate them manually to create a training corpus, and allow the rules engine to learn from the training corpus. In this aspect, aggregate a wide range of sites so that when a new site comes along, zones can be laid out without human interaction. In some cases, this logic could be built into a browser so that as it come across new sites it has not seen before, and that do not exist in any kind of available database, the rules engine can apply a best-case for how to navigate that site.

[0135] Referring now to FIG. **14**, some embodiments employ machine learning including training and test corpuses and a scraper as part of an offline training process. The scraping process typically happens earlier before the user interacts with the site. Scraper **1403** rips through hundreds, thousands, or more merchant web sites **1401-1**, **1401-2**, **1401**-N and works out where the buttons are or else the scraper creates a corpus **1405**. A human expert **1407** labels a portion of the web sites in corpus **1405** as to where the buttons are to create training corpus **1409** and this is fed into a machine learning process **1411** to create rules for the rules engine **1011**. A portion of the corpus **1405** can be withheld to use as a test corpus **1429** to determine how well the machine learning process **1411** is functioning. In one or more embodiments, the process just described does not impact the user's experience or training. It is analogous to training a speech recognition engine for general users and when individuals use it they are interacting with something that is already trained. Once the training is completed, if the user navigates to an unknown merchant site, the rules engine is now smart enough, having seen the patterns before, to be able to find the checkout button rather than merely returning a "page not recognized." Rules engines **1011**, **1111** can include rules developed from training as shown in FIG. **14**.

[0136] In some instances, the structure of the web page corresponding to the merchant site can be visually represented as a number of layers; in essence, akin to something solid with holes in it. Stated in another way, the structure of the web page corresponding to the merchant site can be treated as a fine matrix with zones of action; the actions may include, for example, vibration or squeezing. Vibration can be of a certain pattern such as Morse code. Action zones with actions to take/events are then associated with the matrix.

[0137] Some embodiments employ both IF-THEN rules and also a graphical mechanism that allows someone interacting with the engine to "paint" certain areas of the page as good or bad. The merchant site can be coded up and where the buy/confirm button **1015** is located, the appropriate ID, action is embedded (for example, vibrate in a pattern dot-dot-dash-dash). The rules engine **1011** interprets this and there is thus a mapping for an action to be taken. The merchant and/or others cooperating on the process will have in mind particular feedback that means "good" or "bad." Furthermore in this regard, in one or more embodiments, the rules engine requires a digital representation of the page, or at least zones such as buy button, back button, check terms and conditions button—the developer can embed tags in html or can build a tool to allow someone who is not a developer to drags boxes around the screen to mark the desired locations. Some embodiments provide a WYSIWYG (what you see is what you get) to allow a non-developer to mark up a page. One or more embodiments provide a merchant or the entity that manages the merchant's web site with a tool to make the web site interact with the rules engine.

[0138] In another aspect, the rules engine **1011**, **1111** learns what is "good" and "bad" over time and makes suggestions. This can involve scraping pages and/or carrying out image recognition. For example, the merchant may have a site already built and may not want to go back into the html and make changes. In this aspect, "rip" through the site with a "scraper," identify buttons such as **1015**, **1115** by trial and error, and then build events and action zones, effectively reverse engineering a web site to make it accessible to the visually impaired. In some embodiments, a template specifies where to locate desired actions; e.g., where to locate the buy/confirm button **1015**, **1115**, and the like.

[0139] Thus, some aspects incentivize a purchase transaction or guide a person to a certain spot on a web page, while other aspects restrict a purchase transaction or guide a person away from a certain spot on a web page. For the avoidance of doubt, embodiments are not intended to nefariously force people to buy or perform other actions against their will, but rather, for example, to prevent excessive or inappropriate purchases, prevent access to a dangerous web site, or to guide a minor child or the like to buy a healthy snack not candy. Another non-limiting example is to assist someone in reaching an appropriate location—for example, suppose someone is online trying to find a part for his or her refrigerator—there are many different parts—some embodiments could help the individual find the right part. Some embodiments advantageously prevent someone from being compelled or defrauded into purchasing something they should not or taking some other action they should not—some embodiments are not limited to impacting a "purchase/do not purchase" decision.

[0140] Thus, haptic feedback in a digital commerce setting can be used to incentivize/dis-incentivize and/or restrict a purchase. One or more embodiments provide a system to deliver haptic feedback through a consumer device to change consumer behavior around commerce. Using haptic feedback, it is possible to create experiences for consumers that either near or at the time the consumer decides to purchase can change behavior. In one or more embodiments, action is taken before the user actually initiates the purchase and before any authorization request into a payment card network is allowed to occur. This can be useful in helping a consumer adhere to a budget; avoid fraudulent goods or merchants; and the like. It can also create a "reward" in the sense that physical feedback after a purchase can provide the consumer with a greater sense of satisfaction. Some embodiments of the system can also help consumers navigate through an experience to improve accessibility for the

visually impaired or in other circumstances (e.g., the rules engine may cooperate with the other pertinent components to indicate to the user "let me guide you"). Some embodiments of the system can also be reversed to protect consumers by identifying inappropriate implementations of haptic feedback that are intended to nefariously trigger or compel a purchase, and flagging these purchases for enhanced scrutiny by participants in the payments processing value chain.

[0141] One or more embodiments advantageously improve conversion on an e-commerce site (or other digital point of interaction (POI)) and/or digital (VR) environment. One or more embodiments enhance the consumer's purchase experience and/or reduce the incidence of fraud.

Recapitulation

[0142] Given the discussion thus far, it will be appreciated that, in general terms, an exemplary method includes the step **1001** of obtaining, at a rules engine **1011**, a web site map of an external web site. The web site map includes information permitting determination of at least one pertinent location on the web site (e.g., button **1015**). In one or more embodiments, the rules engine contains a representation of the external site. A further step includes obtaining, at the rules engine **1011**, at least one rule specifying peripheral behavior in a region adjacent the at least one pertinent location on the web site (e.g., near or over the button **1015**). An even further step **1003** includes obtaining, at the rules engine **1011**, an indication that a peripheral device (e.g. **1019**) corresponding to the at least one rule is being used to browse the web site **1013**. A still further step **1004** includes dispatching, from the rules engine **1011** to the peripheral device **1019**, instructions corresponding to the at least one rule specifying the peripheral behavior in the region adjacent the at least one pertinent location on the web site. The instructions are configured to cause a stimulus to a user (e.g. user's finger **1017**) of the peripheral device prior to the user attempting to consummate an action on the web site.

[0143] The instructions could include signals to cause actuators in the peripheral to provide the stimulus, or could include rules form the rules engine in a form to be locally evaluated and applied by the peripheral and its driver.

[0144] In one or more embodiments, the peripheral device includes a haptic-enabled peripheral device **1019**, and the instructions dispatched in the dispatching step are configured to cause a haptic stimulus to the user.

[0145] In some instances, in the step **1001** of obtaining the web site map, the web site is a merchant web site **1013**, and the at least one pertinent location on the web site is a buy/confirm button **1015**. In the dispatching step, the action is a purchase transaction.

[0146] The step of obtaining the rules can include, for example, obtaining the rules from at least one of the merchant, the user, and a bank of the user.

[0147] In some cases, the haptic-enabled peripheral device is a glove, and the at least one rule dispatched in the dispatching step is configured to cause a haptic stimulus to the user via the glove.

[0148] In some cases, the haptic glove (e.g., **1019**, **1201**) is formed with an open region (e.g. opening in fingertip) and/or a conductive micro-fiber region permitting use of a touch screen while wearing the glove; and the haptic-enabled peripheral device includes the haptic glove working together with a touch screen (e.g. **810**, **540**) via the open region and/or conductive micro-fiber region. In the step of obtaining the indication that the peripheral device corresponding to the at least one rule is being used to browse the web site, the touch screen is used for the browsing, while in the step of dispatching the instructions configured to cause the stimulus to the user, the stimulus is applied via the haptic glove.

[0149] In some embodiments, the rules engine, the SDK, and the provided APIs are embedded in a piece of hardware such as a touch screen or other monitor, but the haptic feedback is still provided by a glove.

[0150] In one or more embodiments, the at least one rule does not specify any particular behavior for the peripheral device **1019** away from the region adjacent the at least one pertinent location **1015**, but does specify particular behavior for the peripheral device in the region adjacent the at least one pertinent location under appropriate circumstances. The appropriate circumstances could include any entry of the peripheral device into the region adjacent the at least one pertinent location; in an alternative approach, obtain additional data at the rules engine **1011** (e.g., from cloud **1021** as shown at **1003**A), in which case the appropriate circumstances include both entry of the peripheral device into the region adjacent the at least one pertinent location and satisfaction of a condition specified in or derived from the additional data. In a non-limiting example, this additional data could include, for example, the consumer's bank indicating that the consumer should not purchase anything over $1000 because the consumer's monthly budget would be exceeded. The stimulus is then only provided if the peripheral is proximate the button **1015** AND the monthly budget is also going to be exceeded by the purchase.

[0151] In one or more embodiments, in the dispatching step, the instructions are configured to cause the stimulus to repel the user from the at least one pertinent location on the merchant web site.

[0152] Alternatively, under different appropriate circumstances, the system can provide a stimulus to guide the consumer to push the button. The user guidance is illustrated by arrow **1005**. Guidance may be appropriate, for example, for the visually impaired, for minor children, and the like. In the latter case, a child could be encouraged to buy a healthy snack or read a book rather than buying candy or playing a video game. Thus, in some instances, in the dispatching step **1004**, the instructions are configured to cause the stimulus to attract the user to the at least one pertinent location **1015** on the merchant web site **1013**.

[0153] In one or more embodiments, in the step of obtaining the web site map, the information permitting determination of the at least one pertinent location on the web site includes a predefined tag embedded in hypertext markup language of the web site. On the other hand, in other embodiments, in the step of obtaining the web site map, the information permitting determination of the at least one pertinent location on the web site includes ordinary hypertext markup language of the web site (i.e., requiring no special action by the site developer), and a further step includes determining the at least one pertinent location on the web site from the ordinary hypertext markup language. As discussed above, this could be carried out, for example, by engine **1011**, optionally using a machine learning process or the like.

[0154] Some embodiments further include obtaining a training corpus of human-annotated code of scraped publicly

available web sites, and carrying out machine learning on the training corpus to develop rules for the rules engine **1011**. In this aspect, the determining of the at least one pertinent location on the web site from the ordinary hypertext markup language includes applying results of the machine learning, as just discussed. Refer to FIG. **14**.

[0155] As noted, other types of stimulus are possible; for example, the instructions **1004** dispatched in the dispatching step can be configured to cause at least one of a characteristic tone and a vibration on a mobile device of the user (e.g. ring tone on smart phone **800**).

[0156] In a non-limiting example, the rules engine is hosted by an operator of a payment card network such as **2008**, and the stimulus to the user of the peripheral device is caused prior to a payment card authorization request associated with the action being allowed to be initiated to the operator. For example, network operator **2008** only receives the ISO 8583 0100 auth request after the user receives (haptic) stimulus guiding the user to the button, or alternatively, never receives an ISO 8583 0100 auth request or the like for the putative transaction where the user is guided away from the button.

[0157] Furthermore, given the discussion thus far, it will be appreciated that, in general terms, another exemplary method includes the step of obtaining, at a rules engine **1111**, at least one rule specifying peripheral behavior when browsing a web site (e.g., a merchant site **1113** or another site not necessarily of a merchant) for which a site map is not available to the rules engine. A further step includes obtaining, at the rules engine, an indication that a peripheral device (e.g. **1119**) corresponding to the at least one rule is being used to browse the web site—for example, the peripheral communicates with the browser which locally renders the site, and the browser communicates with the engine **1111**. An even further step **1104** includes dispatching, from the rules engine to the peripheral device, instructions corresponding to the at least one rule specifying the peripheral behavior when browsing the web site. The instructions are configured to cause a stimulus to a user (e.g., finger **1117** thereof) of the peripheral device prior to the user attempting to consummate an action on the web site.

[0158] In one or more embodiments, the peripheral device includes a haptic-enabled peripheral device **1119**, and the instructions dispatched in the dispatching step **1104** are configured to cause a haptic stimulus to the user.

[0159] In some instances, the haptic-enabled peripheral device includes a touch screen (e.g. **810**, **540**) and a haptic glove (e.g., **1019**, **1201**) is formed with at least one of an open region (e.g. opening in fingertip) and a conductive micro-fiber region permitting use of the touch screen while wearing the glove. The haptic glove works together with the touch screen via the open region and/or the conductive micro-fiber region. In the step of obtaining the indication that the peripheral device corresponding to the at least one rule is being used to browse the web site, the touch screen is used for the browsing; in the step of dispatching the instructions configured to cause the stimulus to the user, the stimulus is applied via the haptic glove.

[0160] In some cases, in the dispatching step, the instructions are configured to cause the stimulus to repel the user from further navigation of the web site (e.g., without further navigations thereon). The aspect of warning a user away from a potentially dangerous web site is applicable to both merchant/commerce sites and other kinds of sites.

[0161] In some cases, in the dispatching step, the instructions are further configured to cause the stimulus to encourage the user to initiate at least one of a virus scan and a malware scan. For example, the peripheral **1119** guides the user to the icon for the corresponding scan app.

[0162] The rules engine **1111** can be provided, for example, as a service, by an entity such as an anti-virus software provider, an anti-malware software provider, a browser plug-in provider, and/or a browser provider. For example, engine **1111** could be implemented by an entity that monitors web sites, such as a browser provider; via anti-virus software; via a plug-in that a user downloads to his or her browser (similar to a popup blocker) to warn the user that the site might be unsafe; or the like.

[0163] The web site can be a merchant web site, and the obtaining **1103** of the indication that the peripheral device is being used to browse the web site can include obtaining, for example, shopping basket contents, and an identity and/or a merchant category of the merchant (for example, to limit a child's access to certain web sites—could be based on specific sites or a category). The instructions can be configured to cause the stimulus to the user prior to the user attempting to consummate a purchase on the web site, the stimulus can indicate to the user one of a BUY and a DO NOT BUY recommendation.

[0164] Also contemplated are systems and/or apparatuses as disclosed herein. For example, an apparatus could include a rules engine including a memory **812** or **530** (discussed below); and at least one processor **802** or **520** (discussed below), coupled to the memory, and operative to carry out any one, some, or all of the method steps described herein. In some instances, the apparatus also includes a haptic-enabled peripheral device (e.g., **1019**, **1201**) coupled to the rules engine; for example, via the device driver **1099** as described. In some cases, the haptic-enabled peripheral device in turn includes a touch screen; and a haptic glove as described above. The touch screen may have an appropriate screen driver or the like to integrate with the rules engine and glove.

System and Article of Manufacture Details

[0165] Embodiments of the invention can employ hardware and/or hardware and software aspects. Software includes but is not limited to firmware, resident software, microcode, etc.

[0166] Software might be employed, for example, in connection with one or more modules to implement at least a portion of one or more of the elements of the systems and/or flows of FIGS. **10-14**; a terminal **122**, **124**, **125**, **126**; a reader **132**; a host, server, and/or processing center **140**, **142**, **144** (optionally with data warehouse **154**) of a merchant, issuer, acquirer, processor, other third party, or operator of a network **2008** and/or rules engine **1011**, **1111**; and the like. Firmware might be employed, for example, in connection with payment devices such as cards **102**, **112**, as well as reader **132**.

[0167] FIG. **3** is a block diagram of a system **500** that can implement part or all of one or more aspects or processes of the invention. As shown in FIG. **3**, memory **530** configures the processor **520** (which could correspond, e.g., to processor portions **106**, **116**, **130**; a processor of a terminal or a reader **132**; processors of remote hosts in centers **140**, **142**, **144**; processors of a merchant, issuer, acquirer, processor, other third party, or operator of a network **2008** and/or

systems and/or flows of FIGS. **10-14**, rules engine **1011**, **1111**; and the like); to implement one or more aspects of the methods, steps, and functions disclosed herein (collectively, shown as process **580** in FIG. **3**). Different method steps can be performed by different processors. The memory **530** could be distributed or local and the processor **520** could be distributed or singular. The memory **530** could be implemented as an electrical, magnetic or optical memory, or any combination of these or other types of storage devices (including memory portions as described above with respect to cards **102**, **112**). It should be noted that if distributed processors are employed, each distributed processor that makes up processor **520** generally contains its own addressable memory space. It should also be noted that some or all of computer system **500** can be incorporated into an application-specific or general-use integrated circuit. For example, one or more method steps could be implemented in hardware in an application specific integrated circuit (ASIC) or field programmable gate array (FPGA) rather than using firmware. Display **540** is representative of a variety of possible input/output devices (e.g., displays, printers, keyboards, mice, touch screens, touch pads, and so on).

[0168] As is known in the art, part or all of one or more aspects of the methods and apparatus discussed herein may be distributed as an article of manufacture that itself comprises a tangible computer readable recordable storage medium having computer readable code means embodied thereon. The computer readable program code means is operable, in conjunction with a computer system, to carry out all or some of the steps to perform the methods or create the apparatuses discussed herein. A computer-usable medium may, in general, be a recordable medium (e.g., floppy disks, hard drives, compact disks, EEPROMs, or memory cards) or may be a transmission medium (e.g., a network comprising fiber-optics, the world-wide web, cables, or a wireless channel using time-division multiple access, code-division multiple access, or other radio-frequency channel). Any medium known or developed that can store information suitable for use with a computer system may be used. The computer-readable code means is any mechanism for allowing a computer to read instructions and data, such as magnetic variations on a magnetic medium or height variations on the surface of a compact disk. The medium can be distributed on multiple physical devices (or over multiple networks). For example, one device could be a physical memory media associated with a terminal and another device could be a physical memory media associated with a processing center. As used herein, a tangible computer-readable recordable storage medium is defined to encompass a recordable medium (non-transitory storage), examples of which are set forth above, but does not encompass a transmission medium or disembodied signal.

[0169] The computer systems and servers described herein each contain a memory that will configure associated processors to implement the methods, steps, and functions disclosed herein. Such methods, steps, and functions can be carried out, by way of example and not limitation, by processing capability on one, some, or all of elements **122**, **124**, **125**, **126**, **140**, **142**, **144**, **2004**, **2006**, **2008**, **2010**; on a computer implementing aspects of network **2008** and/or rules engine **1011**, **1111**, and/or systems and/or flows of FIGS. **10-14**; on processors of hosts and/or servers of other parties described herein; and the like. The memories could be distributed or local and the processors could be distributed or singular. The memories could be implemented as an electrical, magnetic or optical memory, or any combination of these or other types of storage devices. Moreover, the term "memory" should be construed broadly enough to encompass any information able to be read from or written to an address in the addressable space accessed by an associated processor. With this definition, information on a network is still within a memory because the associated processor can retrieve the information from the network.

[0170] Thus, elements of one or more embodiments of the invention, such as, for example, **122**, **124**, **125**, **126**, **140**, **142**, **144**, **2004**, **2006**, **2008**, **2010**; a computer implementing aspects of network **2008** and/or rules engine **1011**, **1111**, and/or systems and/or flows of FIGS. **10-14**; hosts and/or servers of other parties described herein; and the like, can make use of computer technology with appropriate instructions to implement method steps described herein. Some aspects can be implemented, for example, using one or more servers which include a memory and at least one processor coupled to the memory. The memory could load appropriate software. The processor can be operative to perform one or more method steps described herein or otherwise facilitate their performance.

[0171] Accordingly, it will be appreciated that one or more embodiments of the invention can include a computer program product comprising computer program code means adapted to perform one or all of the steps of any methods or claims set forth herein when such program is run on a computer, and that such program may be embodied on a computer readable medium. Further, one or more embodiments of the present invention can include a computer comprising code adapted to cause the computer to carry out one or more steps of methods or claims set forth herein, together with one or more apparatus elements or features as depicted and described herein.

[0172] As used herein, including the claims, a "server" includes a physical data processing system (for example, system **500** as shown in FIG. **3**) running a server program. It will be understood that such a physical server may or may not include a display, keyboard, or other input/output components. A "host" includes a physical data processing system (for example, system **500** as shown in FIG. **3**) running an appropriate program.

[0173] Furthermore, it should be noted that any of the methods described herein can include an additional step of providing a system comprising distinct software modules embodied on one or more tangible computer readable storage media. All the modules (or any subset thereof) can be on the same medium, or each can be on a different medium, for example. The modules can include any or all of the components shown in the figures. The method steps can be carried out using the distinct software modules of the system, as described above, executing on the one or more hardware processors. Further, a computer program product can include a tangible computer-readable recordable storage medium with code adapted to be executed to carry out one or more method steps described herein, including the provision of the system with the distinct software modules.

[0174] Thus, aspects of the invention can be implemented, for example, by one or more appropriately programmed general purpose computers, such as, for example, servers, mobile devices, or personal computers, located at one or more of the entities in the figures, as well as within the payment network **2008**, rules engine **1011**, **1111** and/or

systems and/or flows of FIGS. **10-14**. Such computers can be interconnected, for example, by one or more of payment network **2008**, another VPN, the Internet, a local area and/or wide area network (LAN and/or WAN), via an EDI layer, and so on. Note that element **2008** represents both the network and its operator. The computers can be programmed, for example, in compiled, interpreted, object-oriented, assembly, and/or machine languages, for example, one or more of C, C++, Java, Visual Basic, COBOL, Assembler, Structured Query Language (SQL), and the like (an exemplary and non-limiting list), and can also make use of, for example, Extensible Markup Language (XML), known application programs such as relational database applications (e.g., IBM DB2® software available from International Business Machines Corporation, Armonk, N.Y., US; SAS® software available from SAS Institute, Inc., Cary, N.C., US), spreadsheets (e.g., MICROSOFT EXCEL® software available from Microsoft Corporation, Redmond, Wash., US), and the like. The computers can be programmed to implement the logic and/or data flow depicted in the figures. In some instances, messaging and the like may be in accordance with the International Organization for Standardization (ISO) Specification 8583 *Financial transaction card originated messages—Interchange message specifications* and/or the ISO 20022 or UNIFI Standard for Financial Services Messaging, also incorporated herein by reference in its entirety for all purposes. In one or more embodiments, some messages may be in accordance with NACHA Automated Clearing House (ACH) rules and regulations.

[0175] Although illustrative embodiments of the invention have been described herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various other changes and modifications may be made by one skilled in the art without departing from the scope or spirit of the invention.

1. A method comprising:

obtaining, at a rules engine, a web site map of a web site, said web site map including information permitting determination of at least one pertinent location on said web site;

obtaining, at said rules engine, at least one rule specifying peripheral behavior in a region adjacent said at least one pertinent location on said web site, wherein said at least one rule does not specify any particular behavior for a peripheral device away from said region adjacent said at least one pertinent location, and specifies particular behavior for said peripheral device in said region adjacent said at least one pertinent location under appropriate circumstances;

obtaining, at said rules engine, an indication that said peripheral device corresponding to said at least one rule is being used to browse said web site;

obtaining additional data at said rules engine, wherein said appropriate circumstances comprise both entry of said peripheral device into said region adjacent said at least one pertinent location and satisfaction of a condition specified in or derived from said additional data, said satisfaction of said condition being independent of said at least one pertinent location and a location of said peripheral device in relation to said at least one pertinent location; and

dispatching, from said rules engine to said peripheral device, instructions corresponding to said at least one rule specifying said peripheral behavior in said region adjacent said at least one pertinent location on said web site, said instructions being configured to cause a stimulus to a user of said peripheral device prior to said user attempting to consummate an action on said web site.

2. The method of claim **1**, wherein said peripheral device comprises a haptic-enabled peripheral device, and wherein said instructions dispatched in said dispatching step are configured to cause a haptic stimulus to said user.

3. The method of claim **2**, wherein:

in said step of obtaining said web site map, said web site comprises a merchant web site, and said at least one pertinent location on said web site comprises a buy/confirm button; and

in said dispatching step, said action comprises a purchase transaction.

4. The method of claim **3**, wherein said step of obtaining said rules comprises obtaining said rules from at least one of a merchant, said user, and a bank of said user.

5. The method of claim **2**, wherein said haptic-enabled peripheral device comprises a glove, and wherein said at least one rule dispatched in said dispatching step is configured to cause a haptic stimulus to said user via said glove.

6. The method of claim **5**, wherein:

said haptic glove is formed with at least one of an open region and a conductive micro-fiber region permitting use of a touch screen while wearing said glove;

said haptic-enabled peripheral device comprises said haptic glove working together with said touch screen via said at least one of an open region and a conductive micro-fiber region;

in said step of obtaining said indication that said peripheral device corresponding to said at least one rule is being used to browse said web site, said touch screen is used for said browsing; and

in said step of dispatching said instructions configured to cause said stimulus to said user, said stimulus is applied via said haptic glove.

7. (canceled)

8. The method of claim **1**, wherein said appropriate circumstances comprise any entry of said peripheral device into said region adjacent said at least one pertinent location.

9. (canceled)

10. The method of claim **1**, wherein, in said dispatching step, said instructions are configured to cause said stimulus to attract said user to said at least one pertinent location on a merchant web site.

11. The method of claim **1**, wherein, in said dispatching step, said instructions are configured to cause said stimulus to repel said user from said at least one pertinent location on a merchant web site.

12. The method of claim **1**, wherein, in said step of obtaining said web site map, said information permitting determination of said at least one pertinent location on said web site comprises a predefined tag embedded in hypertext markup language of said web site.

13. The method of claim **1**, wherein, in said step of obtaining said web site map, said information permitting determination of said at least one pertinent location on said web site comprises ordinary hypertext markup language of

said web site, further comprising determining said at least one pertinent location on said web site from said ordinary hypertext markup language.

14. The method of claim **13**, further comprising:

obtaining a training corpus of human-annotated code of scraped publicly available web sites; and

carrying out machine learning on said training corpus to develop rules for said rules engine;

wherein said determining of said at least one pertinent location on said web site from said ordinary hypertext markup language comprises applying results of said machine learning.

15. The method of claim **1**, wherein said instructions dispatched in said dispatching step are configured to cause at least one of a characteristic tone and a vibration on a mobile device of said user.

16. The method of claim **1**, wherein said rules engine is hosted by an operator of a payment card network, and wherein said stimulus to said user of said peripheral device is caused prior to a payment card authorization request associated with said action being allowed to be initiated to said operator.

17. A method comprising:

obtaining, at a rules engine, at least one rule specifying peripheral behavior when browsing a web site for which a site map is not available to said rules engine;

obtaining, at said rules engine, an indication that a peripheral device corresponding to said at least one rule is being used to browse said web site;

obtaining additional data at said rules engine, said additional data specifying or indicating a condition, a satisfaction of said condition being independent of said at least one pertinent location and a location of said peripheral device in relation to at least one pertinent location; and

dispatching, from said rules engine to said peripheral device, instructions corresponding to said at least one rule specifying said peripheral behavior when browsing said web site and said condition is satisfied, said instructions being configured to cause a stimulus to a user of said peripheral device prior to said user attempting to consummate an action on said web site.

18. The method of claim **17**, wherein said peripheral device comprises a haptic-enabled peripheral device, and wherein said instructions dispatched in said dispatching step are configured to cause a haptic stimulus to said user.

19. The method of claim **18**, wherein:

said haptic-enabled peripheral device comprises:

a touch screen; and

a haptic glove formed with at least one of an open region and a conductive micro-fiber region permitting use of said touch screen while wearing said glove, said haptic glove working together with said touch screen via said at least one of an open region and a conductive micro-fiber region;

in said step of obtaining said indication that said peripheral device corresponding to said at least one rule is being used to browse said web site, said touch screen is used for said browsing; and

in said step of dispatching said instructions configured to cause said stimulus to said user, said stimulus is applied via said haptic glove.

20. The method of claim **18**, wherein, in said dispatching step, said instructions are configured to cause said stimulus to repel said user from further navigation of said web site.

21. The method of claim **20**, wherein, in said dispatching step, said instructions are further configured to cause said stimulus to encourage said user to initiate at least one of a virus scan and a malware scan.

22. The method of claim **18**, further comprising an entity providing said rules engine as a service, said entity comprising at least one of an anti-virus software provider, an anti-malware software provider, a browser plug-in provider, and a browser provider.

23. The method of claim **18**, wherein:

said web site comprises a merchant web site;

said obtaining of said indication that said peripheral device is being used to browse said web site comprises obtaining:

at least one of an identity and a merchant category of a merchant; and

a shopping basket contents;

said instructions are to cause said stimulus to said user prior to said user attempting to consummate a purchase on said web site, said stimulus indicating to said user one of a BUY and a DO NOT BUY recommendation.

24. An apparatus comprising:

a rules engine, said rules engine in turn comprising;

a memory; and

at least one processor, coupled to said memory, and operative to:

obtain a web site map of an web site, said web site map including information permitting determination of at least one pertinent location on said web site;

obtain at least one rule specifying peripheral behavior in a region adjacent said at least one pertinent location on said web site, wherein said at least one rule does not specify any particular behavior for a peripheral device away from said region adjacent said at least one pertinent location, and specifies particular behavior for said peripheral device in said region adjacent said at least one pertinent location under appropriate circumstances;

obtain an indication that said peripheral device corresponding to said at least one rule is being used to browse said web site;

obtain additional data at said rules engine, wherein said appropriate circumstances comprise both entry of said peripheral device into said region adjacent said at least one pertinent location and satisfaction of a condition specified in or derived from said additional data, said satisfaction of said condition being independent of said at least one pertinent location and a location of said peripheral device in relation to said at least one pertinent location; and

dispatch to said peripheral device, instructions corresponding to said at least one rule specifying said peripheral behavior in said region adjacent said at least one pertinent location on said web site, said instructions being configured to cause a stimulus to a user of said peripheral device prior to said user attempting to consummate an action on said web site.

25. The apparatus of claim **24**, further comprising a haptic-enabled peripheral device coupled to said rules engine; said haptic-enabled peripheral device in turn comprising:

a touch screen; and

a haptic glove formed with at least one of an open region and a conductive micro-fiber region permitting use of said touch screen while wearing said glove, said haptic glove working together with said touch screen via said at least one of an open region and a conductive micro-fiber region;

wherein:

when said at least one processor obtains said indication that said peripheral device corresponding to said at least one rule is being used to browse said web site, said touch screen is used for said browsing; and

when said at least one processor dispatches said instructions configured to cause said stimulus to said user, said stimulus is applied via said haptic glove.

26. An apparatus comprising:

a rules engine, said rules engine in turn comprising;

a memory; and

at least one processor, coupled to said memory, and operative to:

obtain at least one rule specifying peripheral behavior when browsing a web site for which a site map is not available to said rules engine;

obtain an indication that a peripheral device corresponding to said at least one rule is being used to browse said web site;

obtain additional data at said rules engine, said additional data specifying or indicating a condition, a satisfaction of said condition being independent of said at least one pertinent location and a location of said peripheral device in relation to at least one pertinent location; and

dispatch, to said peripheral device, instructions corresponding to said at least one rule specifying said peripheral behavior when browsing said web site and said condition is satisfied, said instructions being configured to cause a stimulus to a user of said peripheral device prior to said user attempting to consummate an action on said web site.

27. The apparatus of claim **26**, further comprising a haptic-enabled peripheral device coupled to said rules engine; said haptic-enabled peripheral device in turn comprising:

a touch screen; and

a haptic glove formed with at least one of an open region and a conductive micro-fiber region permitting use of said touch screen while wearing said glove, said haptic glove working together with said touch screen via said at least one of an open region and a conductive micro-fiber region;

wherein:

when said at least one processor obtains said indication that said peripheral device corresponding to said at least one rule is being used to browse said web site, said touch screen is used for said browsing; and

when said at least one processor dispatches said instructions configured to cause said stimulus to said user, said stimulus is applied via said haptic glove.

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