US 20080189187A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2008/0189187 A1**

(43) **Pub. Date: Aug. 7, 2008**

HAO et al.

(54) **POPULATING AN E-COMMERCE SHOPPING CART AND OTHER E-COMMERCE FIELDS BASED UPON CONTENT EXTRACTED FROM NATURAL LANGUAGE INPUT**

(75) Inventors: **Biao HAO**, Bedford, TX (US); **Shiju MATHAI**, Carrollton, TX (US)

Correspondence Address:
PATENTS ON DEMAND, P.A.
4581 WESTON ROAD, SUITE 345
WESTON, FL 33331

(73) Assignee: **INTERNATIONAL BUSINESS MACHINES CORPORATION**, ARMONK, NY (US)

(21) Appl. No.: **11/670,251**

(22) Filed: **Feb. 1, 2007**

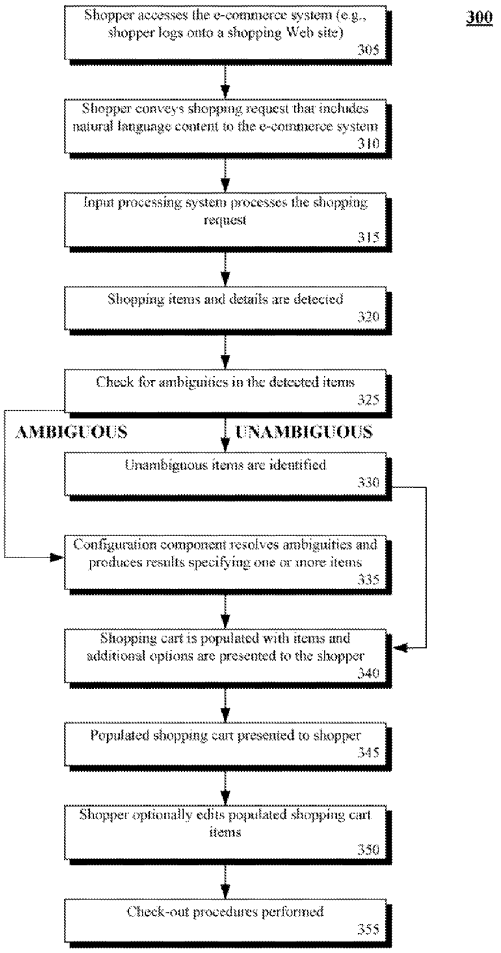
Publication Classification

(51) **Int. Cl.**
G06Q 30/00 (2006.01)

(52) **U.S. Cl.** **705/26**

(57) **ABSTRACT**

The present invention can include an e-commerce shopping method that includes a step of receiving shopper free form input representing a shopping request. A software program can extract semantics from the shopper free form input relating to at least one item available for sale. At least one item can be automatically added to an electronic shopping cart based upon the extracted semantics. A shopper can be permitted to check-out shopping cart items and/or to edit items, item details, and desired quantities contained in the shopping cart.



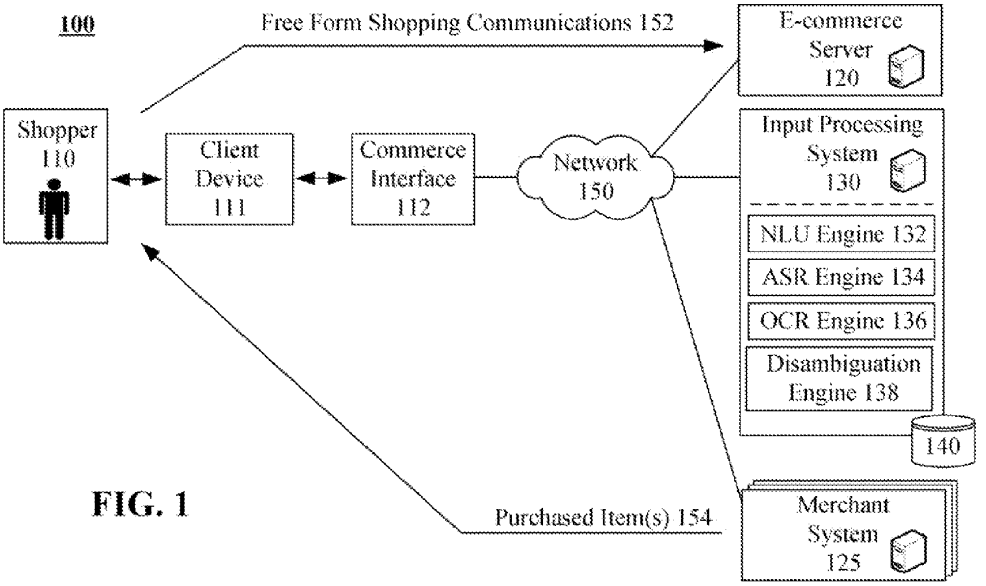

100
Free Form Shopping Communications 152
E-commerce Server 120
Shopper 110
Client Device 111
Commerce Interface 112
Network 150
Input Processing System 130
NLU Engine 132
ASR Engine 134
OCR Engine 136
Disambiguation Engine 138
140
Merchant System 125
Purchased Item(s) 154

FIG. 1

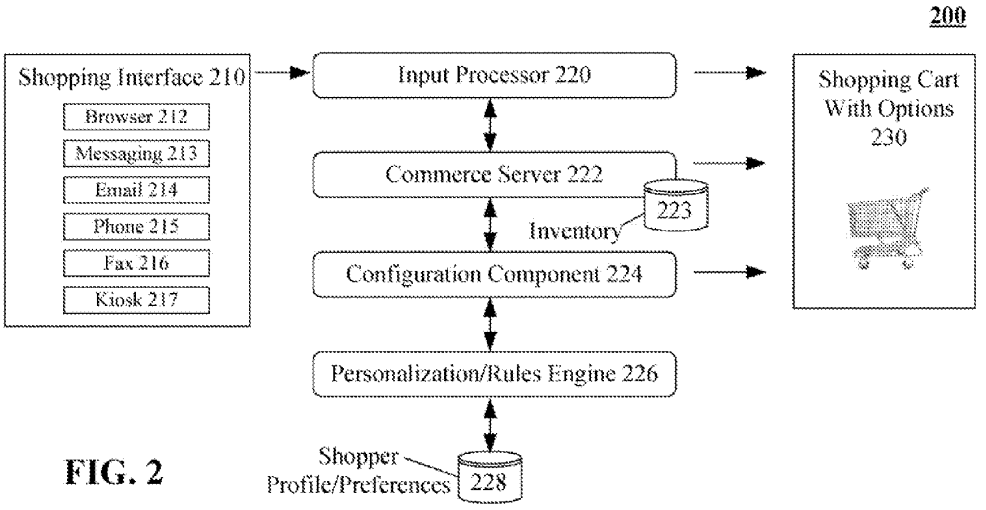

200
Shopping Interface 210
Browser 212
Messaging 213
Email 214
Phone 215
Fax 216
Kiosk 217
Input Processor 220
Commerce Server 222
223
Inventory
Configuration Component 224
Personalization/Rules Engine 226
Shopper Profile/Preferences 228
Shopping Cart With Options 230

FIG. 2

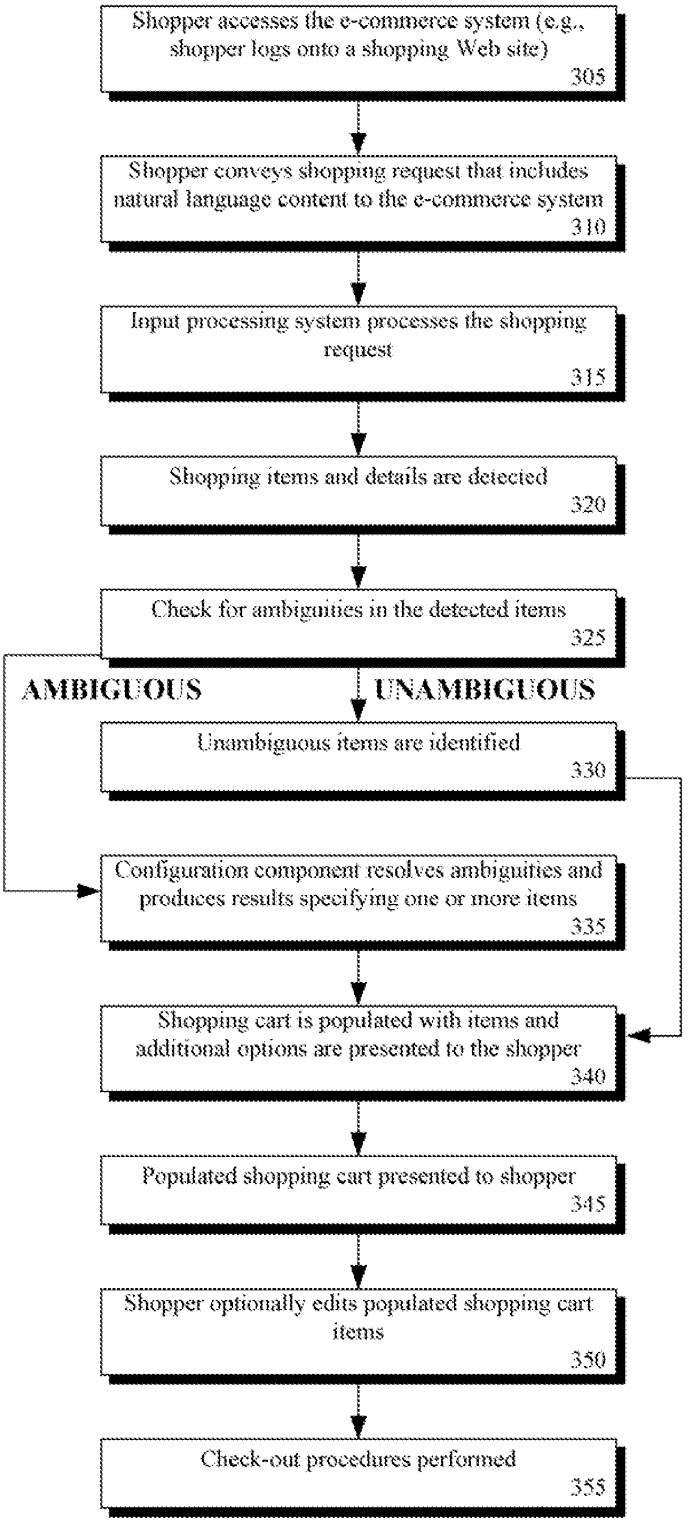

300
Shopper accesses the e-commerce system (e.g., shopper logs onto a shopping Web site)
305
Shopper conveys shopping request that includes natural language content to the e-commerce system
310
Input processing system processes the shopping request
315
Shopping items and details are detected
320
Check for ambiguities in the detected items
325
AMBIGUOUS
UNAMBIGUOUS
Unambiguous items are identified
330
Configuration component resolves ambiguities and produces results specifying one or more items
335
Shopping cart is populated with items and additional options are presented to the shopper
340
Populated shopping cart presented to shopper
345
Shopper optionally edits populated shopping cart items
350
Check-out procedures performed
355

FIG. 3

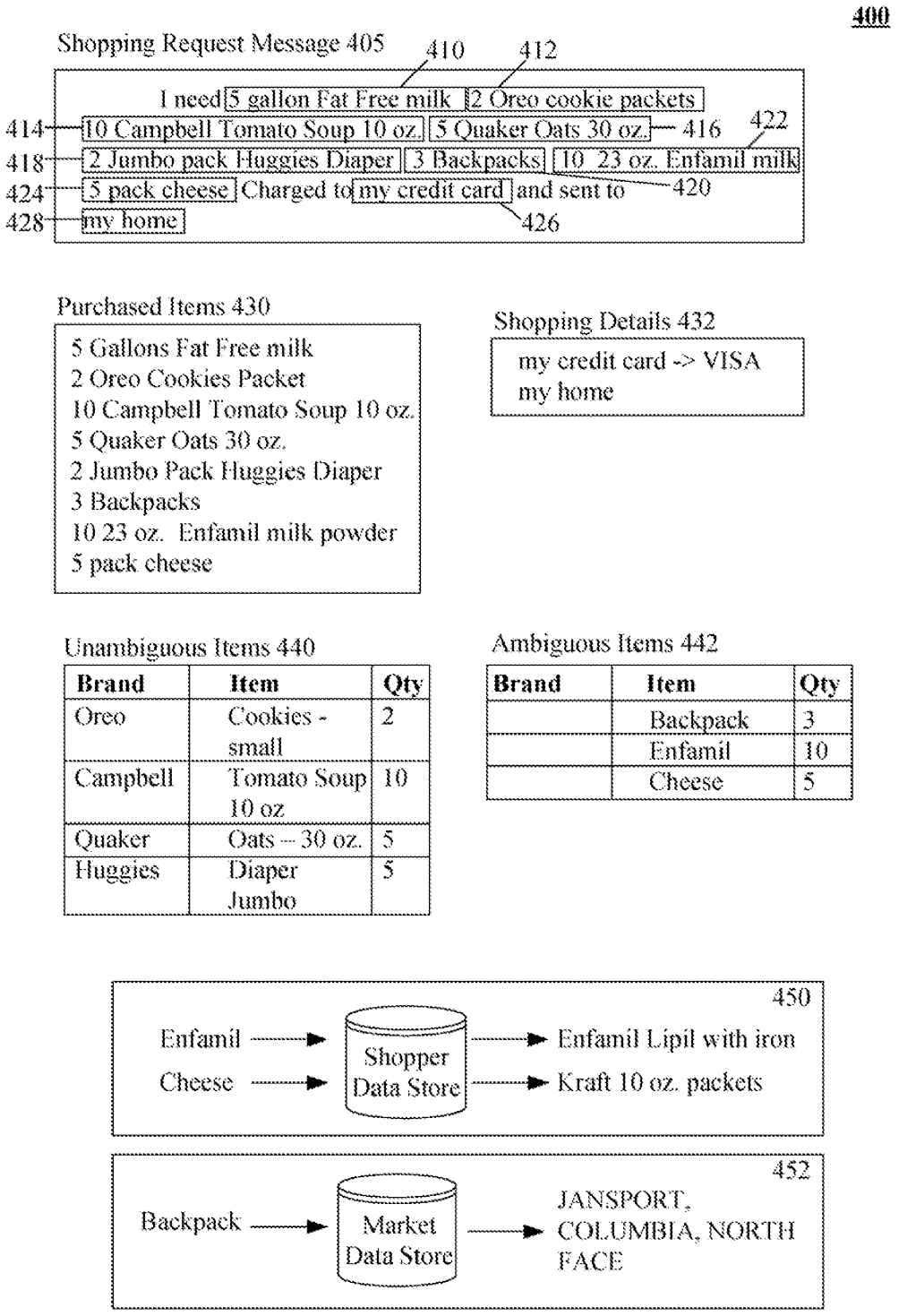

400
Shopping Request Message 405
410
412
I need 5 gallon Fat Free milk 2 Oreo cookie packets
414
10 Campbell Tomato Soup 10 oz.
5 Quaker Oats 30 oz.
416
422
418
2 Jumbo pack Huggies Diaper
3 Backpacks
10 23 oz. Enfamil milk
424
5 pack cheese
Charged to my credit card and sent to
420
428
my home
426
Purchased Items 430
5 Gallons Fat Free milk
2 Oreo Cookies Packet
10 Campbell Tomato Soup 10 oz.
5 Quaker Oats 30 oz.
2 Jumbo Pack Huggies Diaper
3 Backpacks
10 23 oz. Enfamil milk powder
5 pack cheese
Shopping Details 432
my credit card -> VISA
my home
Unambiguous Items 440
Brand | Item | Qty
Oreo | Cookies - small | 2
Campbell | Tomato Soup 10 oz | 10
Quaker | Oats – 30 oz. | 5
Huggies | Diaper Jumbo | 5
Ambiguous Items 442
Brand | Item | Qty
Backpack | 3
Enfamil | 10
Cheese | 5
450
Enfamil
Cheese
Shopper Data Store
Enfamil Lipil with iron
Kraft 10 oz. packets
452
Backpack
Market Data Store
JANSPORT, COLUMBIA, NORTH FACE

FIG. 4

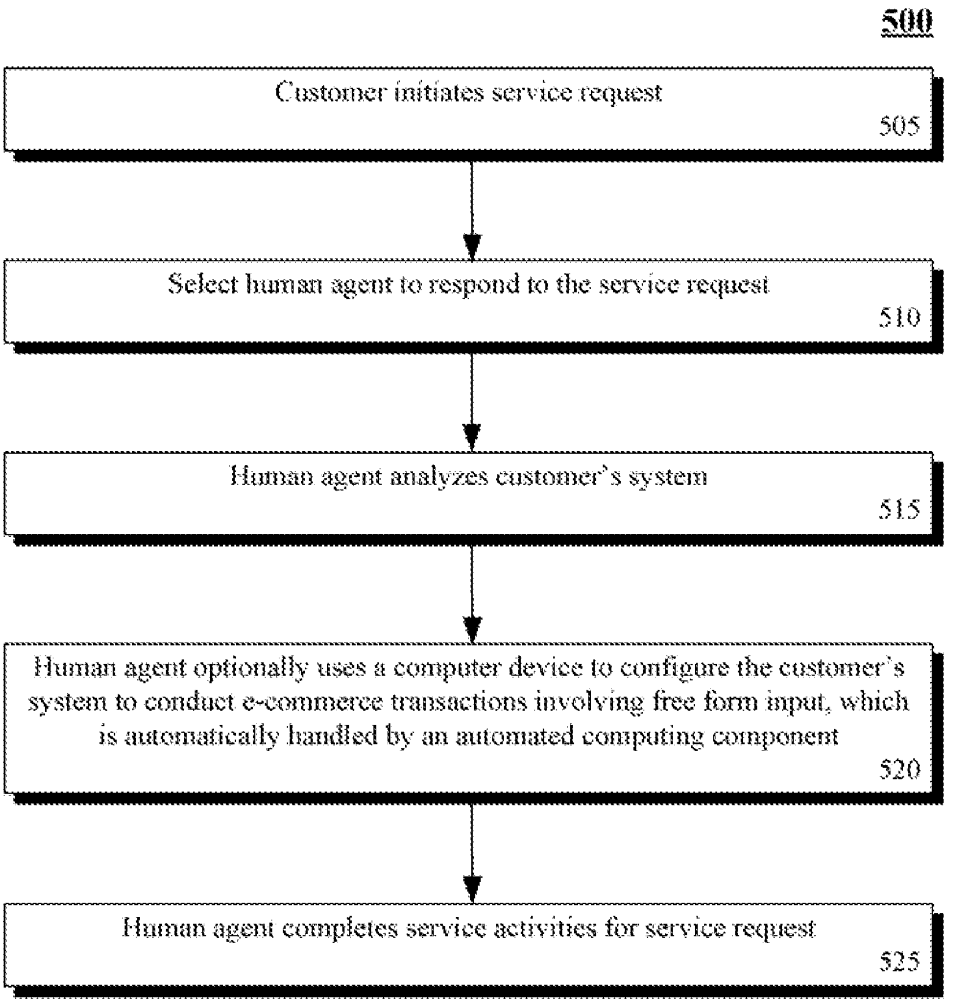

500
Customer initiates service request
505
Select human agent to respond to the service request
510
Human agent analyzes customer's system
515
Human agent optionally uses a computer device to configure the customer's system to conduct e-commerce transactions involving free form input, which is automatically handled by an automated computing component
520
Human agent completes service activities for service request
525

FIG. 5

POPULATING AN E-COMMERCE SHOPPING CART AND OTHER E-COMMERCE FIELDS BASED UPON CONTENT EXTRACTED FROM NATURAL LANGUAGE INPUT

BACKGROUND

[0001] 1. Field of the Invention

[0002] The present invention relates to the field of e-commerce and natural language processing, more particularly, to populating an e-commerce shopping cart and/or other e-commerce fields based upon content contained in natural language input.

[0003] 2. Description of the Related Art

[0004] Electronic commerce or e-commerce relates to the conducting of business communication and transactions over networks and through computers. More specifically, e-commerce includes a buying and selling of goods and services and transferring funds using digital communications and often automated systems. Online shopping is one type of e-commerce transaction, which involves a shopper accessing a Web site linked to a commerce server. Shopper-to-commerce server transactions are not limited to Web based ones but also include telephone based transactions (e.g., Interactive Voice Response transactions), e-commerce transactions, chat based transactions, e-mail based transactions, fax based transactions, and the like.

[0005] Conventional e-commerce shopping is conducted as one or more directed transactions between a shopper and an automated system. A shopper typically browses through a catalogue of available items or uses a database search control to search the catalogue based upon shopper provided criteria. A shopper can select items of interest and can add them to an electronic shopping cart. Once shopping is completed, the shopper can opt to proceed to a check-out stage, where payment and shipping details can be provided and the shopping session can be finalized.

[0006] When a number of available items in the catalogue are large, shopping for a few items out of many thousands of items can be a very tedious task for shoppers. Often, a user is unable to locate a desired item, even though the commerce source being accessed may include that item. This can be especially true when the commerce source includes an amalgamation of items from many different merchant sources. For example, a shopper can interact with a "gateway" source (e.g., AMAZON.COM, SHOPZILLA.COM, and EBAY.COM) that links a shopper to multiple item sources.

[0007] Current approaches to help direct shoppers use guided shopping techniques, which are based upon customer preferences determined by questionnaire responses, customer purchase history, and other such criteria. Current guided shopping techniques are used to anticipate customer-desired items and are effectively a means for direct marketing or direct advertising.

[0008] No known e-commerce technology permits shoppers to conduct shopping transactions using free form input. Further, interactive modalities for automated commerce transactions have been traditionally limited to those modalities (e.g., online shopping via the Web) that lend themselves to catalogue-like interfaces. What is needed is a means to permit customers to conduct e-commerce transactions using free form input, such as natural language input, which is user-friendly interactive means that can be conducted over many different interactive modalities.

SUMMARY OF THE INVENTION

[0009] The present invention discloses a solution designed to enhance e-commerce shopping so that shoppers can interact with an automated system using natural language input. For example, a shopper can submit requests to a commerce server in a natural language, such as English. The requests can be verbal and/or text based and can be conveyed during a real-time communication session (e.g., a telephone communication session, a chat session, and the like) or using a set of exchanged discrete messages (e.g., e-mail, faxes, and the like). Requests can be processed using natural language processing technologies so that meaningful semantics can be extracted from shopper input and intelligent programmatic actions be responsively performed. For example, items ascertained from the input can be automatically placed in the shopper's electronic shopping cart. Moreover, shipping address, payment information, and other e-commerce transaction specific information can be extracted from shopper provided natural language input. In one embodiment, ambiguities associated with the natural language input can be automatically resolved based upon previously recorded shopper preference, a shopper profile, purchase history, etc.

[0010] The present invention can be implemented in accordance with numerous aspects consistent with the material presented herein. For example, one aspect of the present invention can include a system for conducting electronic commerce that includes an e-commerce server, an input processing system, and a merchandise data store. The e-commerce server can receive shopper input and can conduct an e-commerce transaction based upon this input. A shopper can purchase at least one available item during the e-commerce transaction. The input processing system can receive free form shopper input and can semantically interpret the free form shopper input into discrete data fields relevant for the e-commerce transaction. The merchandise data store can record a set of items available for purchase. At least a portion of the discrete data fields can identify shopper desired ones of the set of items.

[0011] Another aspect of the present invention includes a shopper facing e-commerce interface including a natural language input element, a shopping cart, and at least one shopping interactive option. The natural language input element can permit a shopper to input information in a natural language format. The shopping cart can be used to present items specified by the shopper for shopper purchase, wherein the presented items are determined from input provided via the natural language input element. The shopping interactive options can be selected by a user, wherein a selection of one of the options can result in at least one of a change in the items presented in the shopping cart. Another option can finalize of an e-commerce transaction involving a purchase of the items presented in the shopping cart.

[0012] Still another aspect of the present invention can include an e-commerce shopping method that includes a step of receiving shopper free form input representing a shopping request. A software program can extract semantics from the shopper free form input relating to at least one item available for sale. At least one item can be automatically added to an electronic shopping cart based upon the extracted semantics.

An ability can be provided to a corresponding shopper to automatically purchase the items contained in the electronic shopping cart.

[0013] It should be noted that various aspects of the invention can be implemented as a program for controlling computing equipment to implement the functions described herein, or a program for enabling computing equipment to perform processes corresponding to the steps disclosed herein. This program may be provided by storing the program in a magnetic disk, an optical disk, a semiconductor memory, or any other recording medium. The program can also be provided as a digitally encoded signal conveyed via a carrier wave. The described program can be a single program or can be implemented as multiple subprograms, each of which interact within a single computing device or interact in a distributed fashion across a network space.

[0014] It should also be noted that the methods detailed herein can also be methods performed at least in part by a service agent and/or a machine manipulated by a service agent in response to a service request.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] There are shown in the drawings, embodiments which are presently preferred, it being understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown.

[0016] FIG. **1** is a schematic diagram of an e-commerce shopping system that handles free form input, which includes natural language input, in accordance with an embodiment of the inventive arrangements disclosed herein.

[0017] FIG. **2** is a schematic diagram of a system for handling free form input during e-commerce transactions in accordance with an embodiment of the inventive arrangements disclosed herein.

[0018] FIG. **3** is a flow chart of a method for conducting e-commerce transactions based in part upon free form user input in accordance with an embodiment of the inventive arrangements disclosed herein.

[0019] FIG. **4** provides an example of free form text processing during an e-commerce transaction.

[0020] FIG. **5** is a flow chart of a method wherein a service agent can configure an e-commerce system to handle free form shopper input in accordance with an embodiment of the inventive arrangements disclosed herein.

DETAILED DESCRIPTION OF THE INVENTION

[0021] FIG. **1** is a schematic diagram of an e-commerce shopping system **100** that handles free form input, which includes natural language input, in accordance with an embodiment of the inventive arrangements disclosed herein. More specifically, a shopper **110** can utilize a client device **111** hosting a commerce interface **112**, which is communicatively linked to network **150**. An e-commerce server **120**, an input processing system **130**, and a merchant system **125** can also be communicatively linked to network **150**. Shopper **110** can communicate with the e-commerce server **120** within a real-time or a non-real time communication session during which free form shopper provided input **152** can be conveyed to the e-commerce server **120**.

[0022] E-commerce server **120** can convey the input to input processing system **130**, which can extract semantic meaning from the input. For example, speech input can be processed by an automatic speech recognition (ASR) engine **134** and then further processed by a natural language understanding (NLU) engine **132**. In another example, text content contained in a graphical image (i.e., from a facsimile message or from an image file message) can be pre-processed by an optical character recognition (OCR) engine **136** before being processed by the NLU engine **132**. Extracted semantic meanings can be compared to inventory items available to the shopper **110** for purchase from at least one merchant system **125**. Matches can be added to an electronic shopping cart or other commerce artifact provided by the e-commerce server **120**. The shopper **110** can modify purchase details and/or confirm a purchase via options provided by the commerce interface **112** (i.e., shopper **110** can opt to modify shopping cart items and/or proceed to check-out). Once an e-commerce transaction has completed, payment can be sent for purchased items if necessary, and purchased items **154** can be shipped to an address designated by shopper **110**. In one embodiment, this address can be extracted using input processing system **130** from free form shopping communications **152**.

[0023] As shown in system **100**, shopper **110** can be a human actor that engages in an e-commerce transaction. The commerce interface **112** used by the shopper **110** can vary depending on communication type and based upon a type of device **111** upon which the interface **112** executes. Client hosting device **111** can include any communication device linked to network **150** that is configured to accept shopper input **110**, including free form input **152**. The device **111** can include, but is not limited to a computer (e.g., a desktop PC, a client-side server, a notebook computer, a tablet computing device, a personal data assistant, a thin client, and the like), a telephone (e.g., line based phone, mobile telephone, and/or Session Initiation Protocol based phone), a fax machine, an e-mail station, a text-exchange device (e.g., an instant messaging, a text messaging, and/or a chat enabling device), a networked scanner, an entertainment gaming device, a media playing device, an embedded computing system, and/or an e-commerce kiosk.

[0024] E-commerce server **120** can include any automated or partially automated system used to interact with shopper **110**. The e-commerce server **120** can, for example, include a Web server, an Interactive Voice Response (IVR) system, a fax/e-mail processing and routing system, and the like. The e-commerce server **120** can be dedicated to a particular merchant (e.g., an online storefront for the merchant) or can centrally index/manage/handle e-commerce transactions for items provided by multiple different merchants (e.g., AMAZON.COM, EBAY.COM that includes access to EBAY stores and items sold therein, and the like).

[0025] In one embodiment, the e-commerce server **120** can be implemented using Service Oriented Architecture (SOA) based techniques. For instance, the server **120** can be part of a component service model system that permits interactions over numerous modalities and can even include in-session modality switching capabilities in which session state information is preserved. Conventional solutions for implementing e-commerce server **120** can include WEBSPHERE COMMERCE SERVER by International Business Machines Corporation (IBM), WEBLOGIC COMMERCE SERVER by BEA Systems, and any of a variety of other commercial solutions.

[0026] The input processing system **130** can be any system configured to process free form shopping communications **152** and to extract meaningful e-commerce information, such as customer desired products, shipping addresses, payment

details, and the like. In one embodiment, WEBSPHERE components and extensions can be used to implement the various components (**132-138**) of system **130**. Other solutions are available, however, any of which can be utilized for system **100**.

[0027] The disambiguation engine **138** can utilize data, rules, and/or preferences stored in data store **140** to resolve ambiguities. For example, the data store **140** can include historical shopping information for shopper **110**, which can be used to determine a shopper preferred brand and size of an otherwise ambiguous item. A shopper profile **110** can also be stored in data store **140**, where customer preferences such as colors, price thresholds, preferred brands, and the like, can be used by engine **138** to resolve ambiguities. One shopper **110** specific data, such as credit card number information, home address, work address, and the like, can be used to translate natural language items (e.g., my home) into a quantified address (e.g., 1600 Pennsylvania Ave. NW, Washington, D.C. 20500) that can be used during e-commerce transaction. Other non-shopper specific preferences, such as most popular brands sold recently, most popular colors for an item, and the like, can be maintained in the data store **140** and used by disambiguation engine **138**.

[0028] In one embodiment, a confidence value can be established for each semantic unit extracted from free form shopping input **152**. These confidence values can be compared against user/administrator configurable thresholds. When the confidence values exceed an upper threshold, the semantic unit can be presumed to be accurate and corresponding e-commerce fields can be automatically filled in. When a confidence value associated for multiple possible interpretations all exceed a lower threshold, a shopper can be prompted to select one of the multiple interpretations and corresponding e-commerce fields can be automatically filled in. When an accurate interpretation for a unit of free form input cannot be determined (a confidence value for a semantic unit falls below a designated threshold) the free form unit can either be ignored or can trigger a prompting operation that prompts the shopper **110** to clarify their intended meaning for the ambiguous unit.

[0029] Network **150** can include any hardware/software/and firmware necessary to convey digital content encoded within carrier waves. Digital content can be contained within analog or digital signals and conveyed though data or voice channels. Network **150** can include local components and data pathways necessary for communications to be exchanged among computing device components and between integrated device components and peripheral devices. Network **150** can also include network equipment, such as routers, data lines, hubs, and intermediary servers which together form a data network, such as the Internet. Network **150** can also include circuit-based communication components and mobile communication components, such as telephony switches, modems, cellular communication towers, and the like. Network **150** can include line based and/or wireless communication pathways.

[0030] It should be appreciated that enhancement permitting free form shopping communications **152** to be applied to an e-commerce context can be integrated into business systems in a variety of fashions. For example, servers **120** and **130** can be integrated into a single e-commerce hardware/software system, which can follow either proprietary or open standards. In another example, enhanced handling of free form input can be implemented within middleware (e.g., WEBSPHERE APPLICATION SERVER) and remotely accessed via application program interfaces (APIs), linking libraries and/or object classes, remote procedure calls, and the like. Further, the ability to handle free form e-commerce input can be implemented in a Web service, which can be made available to e-retailing customers for a valued consideration, such as a fee.

[0031] FIG. **2** is a schematic diagram of a system **200** for handling free form input during e-commerce transactions in accordance with an embodiment of the inventive arrangements disclosed herein. System **200** is an alternative representation for system **100** and can utilize components detailed therein in the performance of described functions.

[0032] In system **200**, a shopper can conduct e-commerce transactions using a shopping interface **210**, such as a browser **212**, a text messaging interface **213**, an e-mail interface **214**, a phone interface **215**, a fax interface **216**, a kiosk interface **217**, and the like. Input can include free form input, which the input processor **220** receives. The input processor **220** can extract semantics from the input that relates to at least one item available for sale. Available items can be specified in an inventory data store **223** of an e-commerce server **222**.

[0033] Whenever an unambiguous match between extracted semantics and inventory items occurs, those items can be automatically placed in a shopping cart **230** along with any discerned quantities and shipping address information. Ambiguities can be resoled and/or accuracy of other entries improved by using shopper specific information maintained within a shopper profile/preferences data store **228**. Shopper specific settings can be configured using a configuration component **224**, which can be based upon automatically determined shopper data, shopper entered information, and historical e-commerce transaction data. The personalization/rules engine **226** can establish merchant and/or e-commerce server **222** specific rules for applying shopper profile/preference information to e-commerce transactions. Processing results from the configuration components **224** can cause changes to items/data contained within the shopping cart **230**.

[0034] Once items are contained within the shopping cart **230**, the shopper can be provided with a series of options to edit, update, and otherwise modify entries of the shopping cart **230**. For example, when an ambiguity exists for a desired item, the shopper can be prompted to select a preferred item from a presented list. In another example, multiple merchant sources (all accessible through the e-commerce server **222**) can provide a shopper desired item, and the shopper can select a preferred merchant source. Interactions to edit shopping cart items can include free form input, which is processed by input processor **220**. System **200** in its various embodiments contemplates the use of a multimodal interface and/or an interface (for interface **210**) that permits both free form and directed interactions.

[0035] As presented herein, each of the data stores **223** and **228** (as well as data store **140** of system **100**) can be a physical or virtual storage space configured to store digital information. Data stores **140**, **223**, and **228** can be physically implemented within any type of hardware including, but not limited to, a magnetic disk, an optical disk, a semiconductor memory, a digitally encoded plastic memory, a holographic memory, or any other recording medium. Each of the data stores **140**, **223**, and **228** can be a stand-alone storage unit as well as a storage unit formed from a plurality of physical devices. Additionally, information can be stored within data store **140**, **223**, and **228** in a variety of manners. For example, informa-

tion can be stored within a database structure or can be stored within one or more files of a file storage system, where each file may or may not be indexed for information searching purposes. Further, data stores **140**, **223**, and/or **228** can utilize one or more encryption mechanisms to protect stored information from unauthorized access.

[0036] FIG. **3** is a flow chart of a method **300** for conducting e-commerce transactions based in part upon free form user input in accordance with an embodiment of the inventive arrangements disclosed herein. Method **300** can be performed in the context of system **100**, system **200**, and/or any similar e-commerce system that includes an input processing component for semantically interpreting free form input.

[0037] Method **300** can begin in step **305**, when a shopper can access an e-commerce server. For example, a shopper can log onto a Web site provided by the e-commerce server. Method **300** interactions are not limited to Web based ones, however, and other mechanisms for interacting (e.g., accessing an IVR system via a telephone) are contemplated, as elaborated upon in system **100** and **200** respectively. In step **310**, the shopper can submit a shopping request in a natural language (or other free form) format to an e-commerce system. The shopping request can be provided using online forms, e-mail, fax, voice over a voice communication channel, mail, chat, and the like.

[0038] In step **315**, an input processing system can process the shopping request. The input processing system can include speech recognition components, OCR components, text analyzing components, NLU components, and the like, which are selectively used as appropriate for the type of message within which the shopping request is contained. In step **320**, one or more shopping items determined from the shopping request can be detected.

[0039] A check for ambiguities can be performed in step **325**. In step **330**, requested items that are unambiguous can be loaded into a shopping cart or other e-commerce artifact, which is associated with a shopper specific e-commerce transaction. In step **335**, ambiguous items can be further resolved by a configuration component. If not completely resolved initially, ambiguous items can be narrowed to a manageable set of possible items. Optional further shopper interactions (e.g., selection of a narrowed option set) can then occur. Results of the narrowing process can place new items in the shopping cart.

[0040] Accordingly, as shown by step **340**, a shopper specific shopping cart can be populated with items ascertained from the shopping request. Additionally, a set of user-selectable options can be narrowed, such as editing options, check-out options, and the like can be associated with the shopping cart. In step **345**, the shopper can be presented with the shopping cart and can be permitted to utilize one or more of the shopping cart options. This presentation can occur in real-time, such as when the e-commerce transaction is conducted via a Web site, or over time through a series of exchanged messages, such as when the e-commerce transaction is conducted via e-mail, mail, or fax messages. Notifications, such as fax notifications and/or e-mail notifications, and/or postal mail notifications, can be provided to inform a shopper that their shopping requests have been processed. In one optional embodiment, a real-time interactive modality (e.g., an online Web based modality and/or a telephony based modality) can be requested to finalize an e-commerce transaction, even when original shopping requests are submitted through a non real-time modality (e.g., mail, fax, e-mail, and the like).

[0041] In step **350**, the shopper can optionally edit populated shopping cart items. In step **355**, the shopper can confirm items in the shopping cart and can finalize the e-commerce transaction. For instance, the shopper can opt to check-out. The user can be prompted to enter any missing check-out information, such as shipping address information, payment information, and the like. It should be noted that some or all of this information can be automatically extracted from previously provided free form input contained within shopping requests, which was processed by an input processing component. Any missing information can also be provided within free form messages, which the input processing component can handle. A purchase order (PO) and other necessary e-commerce transaction artifacts can be automatically generated during the check-out phase of the transaction. The method **300** can be repeated for other e-commerce transactions as desired. Moreover, past transaction history can be stored and used to increase accuracy of future transactions. For example, the configuration component can weigh items that have previously been purchased by a shopper when resolving ambiguities.

[0042] FIG. **4** provides an example **400** of free form text processing during an e-commerce transaction. The example **400** can be conducted using a system **100** or **200**. Example **400** includes a shopping request message **405** containing content provided in a free form format. Specifically content can include "I need 5 gallon Fat Free milk, 2 OREO cookie packets, 10 CAMPBELL Tomato Soup 10 oz., 5 QUAKER OATS 30 oz., 2 Jumbo pack HUGGIES Diaper, 3 backpacks, 10 23 oz. ENFAMIL milk, 5 packs of cheese. Charged to my credit card and sent to my home."

[0043] An input processing component can identify a series of tokens **410-428** that have meaning in an e-commerce context. Different types of tokens, such as purchase item tokens **430** and shopping detail tokens **432**, can be used. Purchase item tokens **430** can include information related to a desired item and an item quantity. Detail tokens **432** can include information related to shipping, payment, and the like.

[0044] Additionally, different tokens **410-428** can have a different identified scope. For example, tokens **410-424** have a unit scope specific to a corresponding token unit. For example, token **410** of "5 gallon fat free milk" applies to a single purchase item. Tokens **426-428** have a global scope that applies to all of the purchase item tokens **430** in the message **405**. For example, token **426** of "my credit card" identifies a payment mechanism for paying for items specified by tokens **410-424**. Other scopes not shown by example **400** can also exist. For example, a free form phrase of "mile, OJ, and Juice—5 each" can have quantity (which is a separate token) with a scope that applies to multiple items (each being a separate item specific token).

[0045] After tokens **410-428** are generated, categorized, and/or scope determined, a first token processing pass can be performed. In the first pass, tokens can be processed and categorized into unambiguous items **440** and ambiguous items **445**, where details of the unambiguous items are clear. For example, a brand, item, and quantity for items associated with tokens **412**, **414**, **416**, and **418** an be clear. Brands and/or other purchase specifics for ambiguous items **445** can be initially unknown.

[0046] A second processing phase can resolve ambiguities using purchase history, preference, and profile information of the shopper. As shown by illustration **450**, a shopper's profile can specify that ENFAMIL LIPIL with iron is a preferred

baby formula. Shopper purchase history can also indicate that cheese refers to KRAFT 10 oz. packets, which resolves ambiguities of token **424**.

[0047] The second processing phase may leave one or more items unresolved, such as token **420** of three backpacks, which is shown by illustration **452**. Brand popularity and general shopper profile information can be used to locate one or more potential candidates for an unresolved item. For example, quality and price thresholds in a shopper profile combined with backpack popularity data (obtained from the purchases of other shoppers) can suggest that backpack refers to "JANSPORT, COLUMBIA, or NORTH FACE" which can be presented to a shopper for shopper selection.

[0048] When quantities, brands, colors, merchant source, and other criteria are not provided, these criteria can be automatically inferred from customer preferences, history, merchant specials, popularity, and other such factors. In one embodiment, a user interface can indicate inferred details using a disguisable indicator to focus user attention to facilitate confirmation.

[0049] For example, a GUI interface can use different colored fields for entries having an associated accuracy score above a previously set threshold from those entries with a lower accuracy score. Backpack specific items can be presented in a field having a red background, brands for ambiguous items can be presented in fields having a yellow background, and unambiguous items can be presented in fields having a green background. When multiple possible attribute values are determined, a pull down control can be provided to permit a user to quickly adjust field values. For example, a pull down control for backpack can include values of JANSPORT, COLUMBIA, NORTH FACE, and OTHER, where OTHER provides users with different options. Further available options, such as item color and/or merchant, can also be presented within pull-down selectors with defaults established.

[0050] It should be appreciated that example **400** is only one possible example illustrating a use of the inventive arrangements disclosed herein. The invention should not be limited to techniques and arrangements expressed herein. Consequently, the example **400** serves as a concrete example to clarify aspects of the invention and is not intended to be construed as a limitation imposed on the inventive scope of the present application. For example, multiple conventional natural language processing technologies currently exist and the invention is not limited to the token identification and processing techniques discussed herein. Similarly, numerous direct marketing and customer preference determination techniques can be used to resolve item ambiguities. Further still, details about a user interface in example **400** focused upon a Web based GUI embodiment and other item prompting, differentiation, and presentation mechanisms are butter suited for other interface types.

[0051] FIG. **5** is a flow chart of a method **500** where a service agent can configure an e-commerce system to handle free form shopper input in accordance with an embodiment of the inventive arrangements disclosed herein. Method **500** can be preformed in the context of systems **100**, **200**, and/or similar system.

[0052] Method **500** can begin in step **505**, when a customer initiates a service request. The service request can be a request for a service agent to extend an existing e-commerce system to handle free form input or to establish a new e-commerce system with free form input handling capabilities. The service request can also be a request to troubleshoot a problem with an existing e-commerce system that handles free form input.

[0053] In step **510**, a human agent can be selected to respond to the service request. In step **515**, the human agent can analyze a customer's current system and can develop a solution. In step **520**, the human agent can configure the customer's system to conduct e-commerce transactions involving free form input, which is automatically handled by an automated computing component. This can include the installation of a hardware/software and the training of customer personnel in aspects of the e-commerce system. In step **525**, the human agent can complete the service activities.

[0054] The present invention may be realized in hardware, software, or a combination of hardware and software. The present invention may be realized in a centralized fashion in one computer system or in a distributed fashion where different elements are spread across several interconnected computer systems. Any kind of computer system or other apparatus adapted for carrying out the methods described herein is suited. A typical combination of hardware and software may be a general purpose computer system with a computer program that, when being loaded and executed, controls the computer system such that it carries out the methods described herein.

[0055] The present invention also may be embedded in a computer program product, which comprises all the features enabling the implementation of the methods described herein, and which when loaded in a computer system is able to carry out these methods. Computer program in the present context means any expression, in any language, code or notation, of a set of instructions intended to cause a system having an information processing capability to perform a particular function either directly or after either or both of the following: a) conversion to another language, code or notation; b) reproduction in a different material form.

[0056] This invention may be embodied in other forms without departing from the spirit or essential attributes thereof. Accordingly, reference should be made to the following claims, rather than to the foregoing specification, as indicating the scope of the invention.

What is claimed is:

1. An e-commerce shopping method comprising:

receiving shopper free form input representing a shopping request;

a software program extracting semantics from the shopper free form input relating to at least one item available for sale;

automatically adding at least one item to an electronic shopping cart based upon the extracted semantics; and

providing an ability to a corresponding shopper to automatically purchase the items contained in the electronic shopping cart.

2. The method of claim **1**, the extracting step further comprising:

during the extracting step, ascertaining an ambiguity regarding a plurality of possible items to which a portion of the free form input refers; and

resolving the ambiguity in favor of one of the possible items based upon previously stored data contained in a machine readable media relating to the shopper, wherein the previously stored data includes at least one of shopper purchase history data and shopper preference data, wherein the at least one added item includes the favored item of the resolving step.

3. The method of claim 1, further comprising:
during the extracting step, ascertaining an ambiguity regarding a plurality of possible items to which a portion of the free form input refers;
narrowing possible interpretations for the ambiguity to a set of likely meanings; and
presenting a set of shopper selectable options for resolving the ambiguity, wherein said set of options is based on results of the narrowing step.

4. The method of claim 1, wherein the steps of method 1 are performed during a real-time interactive communication session between a shopper and an automated commerce system.

5. The method of claim 4, further comprising:
presenting the electronic shopping cart items for shopper confirmation;
providing at least one option for the corresponding shopper to edit presented shopping cart item information;
receiving a user selected response to check out items in the electronic shopping cart; and
finalizing an electronic commerce transaction during check out to finalize the shopper purchase of the check out items.

6. The method of claim 4, wherein the real-time interactive communication session is at least one of an online Web based shopping session, an interactive voice responsive session, and a text-exchange session.

7. The method claim 1, wherein the received free form input is provided within a least one of an e-mail message and a fax message.

8. The method of claim 1, wherein the free form input is speech input in a natural language format.

9. The method of claim 1, wherein the free form input is text input in a natural language format.

10. The method of claim 1, wherein said steps of claim 1 are steps preformed automatically by at least one machine in accordance with at least one computer program having a plurality of code sections that are executable by the at least one machine.

11. The method of claim 1, wherein the steps of claim 1 are performed by at least one of a service agent and a computing device manipulated by the service agent, the steps being performed in response to a service request.

12. A system for conducting electronic commerce comprising:
an e-commerce server configured to receive shopper input, to conduct an e-commerce transaction based upon this input, wherein during the e-commerce transaction a shopper purchases at least one available item;
an input processing system configured to receive free form shopper input and semantically interpret the free form shopper input into discrete data fields relevant for the e-commerce transaction; and
a merchandise data store configured to record a set of items available for purchase, wherein at least a portion of the discrete data fields identify shopper desired ones of the set of items.

13. The system of claim 12 further comprising:
a disambiguation engine configured to resolve ambiguities detected by the input processing system when converting content contained in the free form shopper input to information placed in the discrete data fields; and
a shopper data store configured to store and index shopper specific information that includes information relating to shopper preferences and purchase history, wherein the disambiguation engine utilizes data stored in the shopper data store to resolve ambiguities.

14. The system of claim 12, further comprising:
a natural language understanding engine configured to convert free form shopper input into data into discrete units of information that are associated with the e-commerce transaction.

15. The system of claim 14, wherein the shopper free form input is contained within shopper provided utterances, said system further comprising:
a speech recognition engine configured to convert the shopper provided utterances into text, which is further processed by the natural language understanding engine.

16. The system of claim 14, wherein the shopper free form input is contained within an image file, said system further comprising:
an optional character recognition engine configured to extract text from the image file, which is further processed by the natural language understanding engine.

17. A shopper facing e-commerce interface comprising:
a natural language input element through which a shopper is able to input information in a natural language format;
a shopping cart configured to present a plurality of items specified by the shopper for shopper purchase, wherein the presented items are determined from input provided via the natural language input element; and
at least one shopping interactive option configured to be selected by a user, wherein a selection of the shopping interactive option results in at least one of a change in the items presented in the shopping cart and a finalization of an e-commerce transaction involving a purchase of the items presented in the shopping cart.

18. The interface of claim 17, further comprising:
a shopper profile editing interface configured to permit a shopper to configure item purchasing preferences, which are used by a natural language processing system to resolve ambiguities detected in the input information when the natural language processing system semantically interprets the input information into discrete data elements specific to at least one of the presented items.

19. The interface of claim 17, wherein the interface is a Web based interface accessible via a browser having a graphical user interface (GUI), wherein the natural language input element, the shopping interactive option, and the shopping cart are represented by GUI elements.

20. The interface of claim 17, wherein the interface is a voice only interface for interacting with an automated voice response system over a real-time communication channel.

* * * * *