(e.g., based on the words "send," "my", and "mother"), and flowers may be identified as the type of product that the user intends to have purchased and delivered to the user's mother (e.g., based on the words "send" and "flowers"). Without necessarily receiving any further input from the user, the system 100 may automatically determine the name and address of the user's mother, a payment method associated with the user, a seller from which flowers are to be purchased, a particular item (e.g., a particular flower purchase order) to be purchased from the seller, and the costs associated with the purchase/delivery of the purchase item. Such information may then be utilized to initiate and/or complete a purchase transaction for the purchase item. The name and address of the user's mother may, for example, be determined by querying the user's profile information, the user's address book(s) or contact list(s), the user's social network(s), one or more people search databases, etc. The payment method associated with the user may be determined by querying the user's profile information. The seller from which flowers are to be purchased or the purchase item from the seller may be determined based on a set of preferred merchants indicated by a service provider (e.g., a company associated with the system 100), preference information associated with the user that identifies merchants approved by the user (e.g., the user's profile information may identify a predefined set of merchants from which the user has approved the system 100 to purchase products or services on behalf of the user), or similar criteria. For example, system 100 may determine which flowers are to be purchased from the merchant's range of offerings based on the user's profile information including the types of items a user likes, qualities of items the user likes, the categories of items a user likes, minimum item rating requirements, item pricing requirements, user location and context information, shipping requirements, etc. The associated costs may be determined based on information regarding the seller, the purchase item, the mother's address, the delivery method (e.g., different fees associated with one-day shipping, two-day shipping, etc.), the payment method (e.g., different fees associated with different payment methods), or other information.

[022] It should be noted that while, in some implementations, a purchase transaction for a product or service may be completed without further user input after receiving a natural language utterance (from which the product or service is determined), user input may be solicited (or received unsolicited) from a user in other implementations to determine payment

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information, shipping information, seller information, or other information that is to be used to complete the purchase transaction.

[023] In an implementation, upon receipt of a natural language utterance of a user, and without further user input after the receipt of the utterance, the system 100 may process the utterance to determine a product or service to be purchased, and present (e.g., via a graphical user interface, via an auditory user interface, etc.) a request for user confirmation (or user approval) of the product or service, shipping information that is to be used to deliver the product or service, payment information that is to be used to pay for the product or service, and/or other information to ensure that such information is correct and accepted by the user for use with purchasing the product or service. Upon receipt of the requested confirmation from the user, a purchase transaction for the product or service may be completed without further user input after the receipt of the requested confirmation.

[024] As an example, with respect to the above "Send flowers to my mother" utterance scenario, the following information may be presented to the user as part of the user confirmation request: (i) the name and address of the user's mother; (ii) a payment method associated with the user; (iii) a seller from which flowers are to be purchased; (iv) a particular item (e.g., a particular flower purchase order) to be purchased from the seller; and (v) the costs associated with the purchase/delivery of the purchase item. As a further example, the user may provide any of the following utterances—"That's fine," "The information is correct," "Go ahead and purchase the flowers," "Order the flowers," or other utterance—to indicate the user's confirmation to complete the purchase transaction. As such, based on the confirmation, the purchase transaction for the purchase item (e.g., a particular flower purchase order) may be completed (e.g., without further user input after the receipt of the utterance "Send flowers to my mother" other than the confirmation utterance).

[025] In an implementation, user profile information (e.g., name, payment information, shipping information, preferences, etc.) may be pre-stored so that the user profile information may be utilized by system 100 for preparing and/or completing checkout of product or service purchases. In an implementation, defaults associated with the user profile information, such as default payment information, default shipping information, etc., may be automatically or manually pre-set for preparing and/or completing checkout of product or service purchases.

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[026] In an implementation, preferred sellers, brands, style, size, or other parameters related to products or services may be automatically or manually pre-set as profile information. As an example, preferred sellers from which products or services are to be purchased and preferred brands of such products or services may be automatically pre-set by the system (e.g., pre-set to system preferred sellers and brands) until the preferences are manually modified by the user. The preferred store, brand, style, size, or other parameters may be obtained (e.g., in response to a natural language utterance indicating a product or service without further user input after the receipt of the utterance) to prepare and/or complete checkout of a product or service purchase unless the utterance (or other information) specifies otherwise. In another implementation, the profile information may include information relating to the general likes or dislikes of the user utilized to select the product or service to be purchased including the types of items a user likes, qualities of items the user likes, the categories of items a user likes, minimum item rating requirements, item pricing requirements, user location and context information, shipping requirements, etc.

[027] In an implementation, preparation and/or completion of checkout of product or service purchases may be limited to certain categories of products or services (e.g., no automobiles), a particular price range (e.g., no more than $100), etc., to reduce the number or severity of purchases related to fraud. The categories of product or services and/or the price ranges may, for instance, be automatically or manually pre-set (e.g., automatically preset by the system, manually pre-set by the user).

[028] Other uses of system 100 are described herein and still others will be apparent to those having skill in the art. Having described a high level overview of some of the system functions, attention will now be turned to various system components that facilitate these and other functions.

[029] System Components

[030] System 100 may include a computer system 104, one or more databases 132, one or more remote information sources 142, 144, 164, and/or other components.

[031] To facilitate these and other functions, computer system 104 may include one or more computing devices 110. Each computing device 110 may include one or more processors 112, one or more storage devices 114, and/or other components.

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[032] Processor(s) 112 may be programmed by one or more computer program instructions, which may be stored in storage device(s) 114. The one or more computer program instructions may include, without limitation, voice commerce application 120. Voice commerce application 120 may itself include different sets of instructions that each program the processor(s) 112 (and therefore computer system 104) to perform one or more operations described herein. For example, voice commerce application 120 may include user input processing instructions 122, transaction preparation instructions 124, checkout management instructions 126, profile management instructions 128, user interface instructions 129, and/or other instructions 130 that program computer system 104. Other applications may, of course, include one or more of the instructions 120-130 to perform one or more operations as described herein. As used herein, for convenience, the various instructions will be described as performing an operation, when, in fact, the various instructions program computer system 104 to perform the operation.

[033] In some implementations, a given user device 160 may comprise a given computer device 110. As such, the given user device 160 may comprise processor(s) 112 that are programmed with one or more computer program instructions, such as voice commerce instructions 120, user input processing instructions 122, transaction preparation instructions 124, checkout management instructions 126, profile management instructions 128, user interface instructions 129, and/or other instructions 130.

[034] As used hereinafter, for convenience, the foregoing instructions will be described as performing an operation, when, in fact, the various instructions may program processor(s) 112 (and thereafter computer system 104) to perform the operation.

[035] Registering User Information and Providing Voice Commerce

[036] In an implementation, voice commerce application 120 may register a user to use the system. For example, during registration of a user, voice commerce application 120 may obtain profile information of the user that includes user settings. Information obtained during registration (or registration information) may include, for example, user identification information, payment information, shipping information, user preferences, and/or other information. The registration information may also include preferred sellers, brands, style, size, or other parameters related to products or services as well as limits on the purchase of

particular product and service categories and particular price ranges for products or services. In another implementation, the registration information may also include limitations of certain categories of products or services to be purchased and/or particular price ranges of the products or services to be purchased. The registration information may be stored as profile information associated with the user in one or more databases, such as a database 132.

[037] In an implementation, the voice commerce application 120 may process one or more user inputs to prepare and/or complete checkout of product or service purchases related to the one or more user inputs. The user inputs may comprise an auditory input (e.g., received via a microphone), a visual input (e.g., received via a camera), a tactile input (e.g., received via a touch sensor device), an olfactory input, a gustatory input, a keyboard input, a mouse input, or other user input. As an example, a natural language utterance, a natural language gesture, or other natural language user input may be received from a user, and processed to determine the meaning of the user input (and corresponding actions, if any, to be taken) with respect to preparation and completion of a purchase transaction. It should be noted that while, in some implementations, the receipt of a natural language utterance may trigger preparation and/or completion of a purchase transaction with further user input after the receipt of the utterance, the receipt of a natural language input of another type (e.g., gestures or other non-verbal communication) may, in other implementations, trigger preparation and/or completion of a purchase transaction with further user input after the receipt of the input of the other type. As such, to the extent possible, one or more operations described herein as based on a natural language utterance may, in other implementations, instead be based on a natural language input of another type.

[038] The voice commerce application 120 may utilize instructions associated with one or more speech recognition engines, one or more natural language processing engines, or other components for processing user inputs to determine user requests related to the user inputs. For example, voice commerce application 120 may process a single utterance of a user to determine a product or service that is to be purchased, payment information that is to be used to pay for the product or service, shipping information that is to be used to deliver the product or service, and/or other information that is thereafter utilized to prepare and/or complete the purchase of the product or service.

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[039] In an implementation, voice commerce application 120 may process a user input (e.g., a natural language utterance) to determine one or more words associated with the user input, and initiate one or more user requests (e.g., queries, commands, etc.) based on the determined words, context information associated with the user (e.g., a current location of the user, the time at which the user spoke the utterance, a product or service recently discussed by the user, or other context), user profile information, or other information. As an example, a user may speak the utterance "Order a pizza for delivery," and the voice commerce application 120 may interpret the utterance and determine that the user's intent is to purchase a pizza for delivery to the user. In one use case, without further user input after receiving the utterance, the voice commerce application 120 may initiate and complete a purchase transaction for the pizza to be delivered. If, for instance, the voice commerce application 120 determines that the user is currently at home, it may complete a purchase transaction with a pizza restaurant from which the user has previously ordered pizza to have the previously ordered pizza delivered to the user's house.

[040] In an implementation, voice commerce application 120 may utilize a user input (e.g., a natural language utterance) to determine a product or service that is to be purchased by searching one or more databases associated with one or more sellers (e.g., partners, third party retailers, service providers, etc.). Results obtained from the search may include one or more products and/or services related to the user input. Each set of results may be individually grouped according to its source or product/service category. The voice commerce application 120 may automatically select the product/service to be purchased from the set of results. As an example, a single utterance may automatically result in the selection of a seller (e.g., a third party retailer) and the selection of a product related to the utterance that is available for purchase via the seller.

[041] In an implementation, the voice commerce application 120 may prepare and/or complete checkout of a product or service purchase related to one or more user inputs. The voice commerce application 120 may determine payment information that is to be used to pay for the product or service, shipping information that is to be used to deliver the product or service, and/or other information that is thereafter utilized to prepare and/or complete the purchase of the product or service. In one implementation, the voice commerce application

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120 may automatically complete the checkout of the product or service purchase related to the one or more user inputs. As an example, a single utterance from the user may result in the preparation and/or completion of the checkout of the product or service without further input from the user. In another implementation, the voice commerce application 120 may provide a request for confirmation of the determined product or service, shipping information, payment information, and/or other information to the user to solicit a confirmation from the user to complete the checkout of the product or service purchase.

[042] In an implementation, the voice commerce application 120 may utilize user profile information to prepare and/or complete checkout of product or service purchases via a user input. In an implementation, the voice commerce application 120 may utilize defaults associated with the user profile information, such as default payment information, default shipping information, etc., for preparing and/or completing checkout of product or service purchases. In another implementation, the voice commerce application 120 may utilize product and/or service preferences including preferred sellers, brands, style, size, or other parameters related to products or services for preparing and/or completing checkout of product or service purchases. In another embodiment, the voice commerce application 120 may limit checkout of product or service purchases to certain categories of products or services, a particular price range, etc., to reduce the number or severity of purchases related to fraud. In another implementation, the profile information may determine a product or service to be purchased based from profile information relating to the general likes or dislikes of the user including the types of items a user likes, qualities of items the user likes, the categories of items a user likes, minimum item rating requirements, item pricing requirements, user location and context information, shipping requirements, etc.

[043] Having described high level functions and operations of voice commerce application 120, attention will now be turned to particular functions and operations of voice commerce application 120 as illustrated through its various instructions. The various instructions (e.g., user input processing instructions 122, transaction preparation instructions 124, checkout management instructions 126, profile management instructions 128, user interface instructions 129, and/or other instructions 130) of voice commerce application 120 are

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described individually as discreet sets of instructions by way of illustration and not limitation, as two or more of the instructions may be combined.

[044] User Input Processing

[045] In an implementation, the user input processing instructions 122 may process one or more user inputs of a user to prepare and/or complete checkout of product or service purchases related to the one or more user inputs. The user inputs may comprise an auditory input (e.g., received via a microphone), a visual input (e.g., received via a camera), a tactile input (e.g., received via a touch sensor device), a keyboard input, a mouse input, or other user input. As described herein elsewhere, user input processing instructions 122 may comprise instructions associated with one or more speech recognition engines (e.g., speech recognition engine(s) 220 of FIG. 2), one or more natural language processing engines (e.g., natural language processing engine(s) 230 of FIG. 2), or other components for processing user inputs to determine user requests related to the user inputs. For example, user input processing instructions 122 may process a natural language utterance of a user to determine a product or service that is to be purchased, payment information that is to be used to pay for the product or service, shipping information that is to be used to deliver the product or service, and/or other information that is thereafter utilized to prepare and/or complete the purchase of the product or service.

[046] In one use case, if the user input is a natural language utterance spoken by a user, the natural language utterance may be processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine one or more products or services and/or other information (e.g., payment information, shipping information, seller information, associated cost information, etc.) that can be used to prepare and/or complete checkout of product or service purchases when the user provided the natural language utterance.

[047] In an implementation, the user input processing instructions 122 may utilize one or more previous user inputs (e.g., related to a product or service) in processing a particular user input to determine one or more products or services and/or other information (e.g., payment information, shipping information, seller information, associated cost information, etc.) that

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can be used to prepare and/or complete one or more checkout of product or service purchases.

[048] As an example, a first user input (that occurs prior to a second user input) may be indicative of a user's intent to make a purchase (e.g., without necessarily identifying a product or service type or a product or service), and the second user input may be indicative of a particular product or service type and/or a particular product or service (e.g., without necessarily being indicative of the user's intent to make a purchase). In one use case, for example, a user may provide the utterance "I'm looking to buy something" as the first user input, after which an automated personal assistant (of a related application) may ask the user what the user would like to buy. The user may respond with the second user input by saying "Flowers for my mom." The word "buy" may be recognized when speech recognition is performed on the first user input, and the word "flowers" may be recognized when speech recognition is performed on the second user input. Further processing on the word "buy" may indicate the user's intent to purchase, and further processing on the word "flowers" may indicate the particular product type of a product that the user would like to purchase.

[049] As another example, a first user input (that occurs prior to a second user input) may be indicative of a particular product or service type and/or a particular product or service (e.g., without necessarily being indicative of the user's intent to make a purchase), and the second user input may be indicative of a user's intent to make a purchase (e.g., without necessarily identifying a product or service type or a product or service). In one scenario, for example, the user may provide the utterance "Those are beautiful flowers" while viewing photographs on a friend's social networking page. Subsequently, the user may provide the utterance "I'd like to buy some." The words "those" and "flowers" may be recognized when speech recognition is performed on the first user input, and the words "buy" and some" may be recognized when speech recognition is performed on the second user input. Further processing on the words "those" and "flowers" may indicate the flowers in the photographs that the user viewed on the friend's social networking page, and further processing on the words "buy" and "some" may indicate the user's intent to make a purchase.

[050] FIG. 2 illustrates a system 200 for facilitating natural language processing, according to an implementation of the invention. As shown in FIG. 2, system 200 may comprise input

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device(s) 210, speech recognition engine(s) 220, natural language processing engine(s) 230, application(s) 240, output device(s) 250, database(s) 132, or other components.

[051] In an implementation, one or more components of system 200 may comprise one or more computer program instructions of FIG. 1 and/or processor(s) 112 programmed with the computer program instructions of FIG. 1. As an example, speech recognition engine(s) 220 and/or natural language processing engine(s) 230 may comprise user input processing instructions 122, transaction preparation instructions 124, checkout management instructions 126, profile management instructions 128, or other instructions.

[052] Input device(s) 210 may comprise an auditory input device (e.g., microphone), a keyboard, a mouse, or other input devices. Input received at input device(s) 210 may be provided to speech recognition engine(s) 220 and/or natural language processing engine(s) 230.

[053] Speech recognition engine(s) 220 may process one or more inputs received from input device(s) 210 to recognize one or more words represented by the received inputs. As an example, with respect to auditory input, speech recognition engine(s) 220 may process an audio stream captured by an auditory input device to isolate segments of sound of the audio stream. The sound segments (or a representation of the sound segments) are then processed with one or more speech models (e.g., acoustic model, lexicon list, language model, etc.) to recognize one or more words of the received inputs. Upon recognition of the words of received inputs, the recognized words may then be provided to natural language processing engine(s) 230 for further processing. In other examples, natural language processing engine(s) 230 may process one or more other types of inputs (e.g., visual input representing sign language communication, gestures, or other forms of communication) to recognize one or more words represented by the other types of inputs.

[054] Natural language processing engine(s) 230 may receive one or more inputs from input device(s) 210, speech recognition engine(s) 220, application(s) 240, database(s) 132, or other components. As an example, natural language processing engine(s) 230 may process inputs received from input device(s) 210, such as user inputs (e.g., voice, non-voice, etc.), location-based inputs (e.g., GPS data, cell ID, etc.), other sensor data input, or other inputs to determine context information associated with one or more user inputs. As another example,

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natural language processing engine(s) 230 may obtain profile information, context information, or other information from database(s) 132. The obtained information (or context information determined based on inputs from input device(s) 210) may be processed to determine one or more user inputs of a user. In yet another example, natural language processing engine(s) 230 may process one or more recognized words from speech recognition engine(s) 220 and other information (e.g., information from input device(s) 210, application(s) 240, and/or database(s) 132) to determine one or more user inputs.

[055] In an implementation, natural language processing engine(s) 230, application(s) 240, or other components may store information in database(s) 132 for later use by natural language processing engine(s) 230, application(s) 240, or other components. As an example, as described in further detail elsewhere herein, natural language processing engine(s) 230 may store information regarding user inputs in database(s) 132 and/or update profile information, or other information in database(s) 132 based on the information regarding the user inputs.

[056] Transaction Preparation and Search for Products or Services

[057] In an implementation, transaction preparation instructions 124 may utilize information from a processing of the user inputs (e.g., one or more recognized words, product or service type, product name, seller name, etc.) to determine a product or service that is to be purchased. Transaction preparation instructions 124 may utilize such information to search one or more databases associated with one or more sellers (e.g., partners, third party retailers, service providers, etc.). Results obtained from the search may include one or more products and/or services related to the user input. The results are then utilized by the transaction preparation instructions 124 to select the product or service to be purchased by the user. As an example, a single utterance may automatically result in the selection of a seller (e.g., a third party retailer) and the selection of a product or service related to the utterance that is available for purchase via the seller.

[058] In an implementation, transaction preparation instructions 124 may obtain product or service results related to the user input that are available from a remote information source 140. Remote information sources 140 may include information sources that are accessible to computer system 104 via a remote or external network connection (e.g., outside of a firewall), such as the Internet. For example, as illustrated in FIG. 1, remote information source(s) 140

may include, without limitation, a third party search engine 142 (e.g., GOOGLE, BING, YAHOO, etc.), third party retailers 144, including online retailers and offline retailers having an online presence (e.g., AMAZON, GROUPON, EBAY, EXPEDIA, BESTBUY, etc.), third party service providers 146 (e.g., weather services, calendar/scheduling services, etc.), and/or other information source that is remotely accessible to computer system 104. In another implementation, the transaction preparation instructions 124 may select the product or service (that is to be purchased) from one or more predetermined sets of products or services stored in database 132. For example, system 200 may store one or more sets of predetermined products or services that may be selected by the transaction preparation instructions 124 or included in the product or service results.

[059] In an implementation, transaction preparation instructions 124 may provide a set of product and service results for the search. The transaction preparation instructions 124 may utilize the set of results to select the product or service that is to be purchased. In an implementation, the transaction preparation instructions 124 may select the product or service (that is to be purchased) according to a set of predefined rules. For example, the product or service (that is to be purchased) may be selected based on the user input, location of the user, cost comparison of sellers (e.g., partners, third party retailers, third party service providers, etc.), shipping date comparison of the sellers, or other criteria. In another implementation, the results of the search are presented for selection by the user. In another implementation, the profile information may include information relating to the general likes or dislikes of the user t to determine the product or service to be purchased including the types of items a user likes, qualities of items the user likes, the categories of items a user likes, minimum item rating requirements, item pricing requirements, user location and context information, shipping requirements, etc.

[060] In an implementation, transaction preparation instructions 124 may utilize context information associated with the user to determine the product or service to be purchased. Based on the context information, the transaction preparation instructions 124 may refine the search for products or services to be purchased. In one embodiment, the context information may include personal data associated with the user, data from a database associated with the user, data describing an event, data describing an acoustic environment in which the spoken

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input is received, location, local time, etc. For example, the transaction preparation instructions 124 may utilize the time of the user input to further define the availability of product or service to be purchased.

[061] Continuing the foregoing examples, a user input related to "lawnmower" may cause transaction preparation instructions 124 to cause a search on a third party search engine 142 to be initiated using the search term "lawnmower." In an implementation, depending on the context (e.g., indicating that the user intends to buy a lawnmower), transaction preparation instructions 124 may add additional search terms such as "purchase" or "sale." Transaction preparation instructions 124 may search (in addition to or instead of) other remote information sources 140 as well (e.g., retail related to "lawnmower" from one or more third party retailers 144, landscaping services related to "lawnmower" from one or more third party service providers 146, and/or other information related to "lawnmower" from one or more other remote information sources 140).

[062] In another embodiment, the transaction preparation instructions 124 may utilize user inputs such as location-based inputs (e.g., GPS data, cell ID, etc.) to further refine the search for products or services to be purchased. The transaction preparation instructions 124 may utilize the location-based input to further refine the geographic area in which the products or services are offered. For example, if the user utters "Please buy a pizza," the transaction preparation instructions 124 utilize the location-based inputs to determine the closest pizzeria in relation to the user. In an implementation, the transaction preparation instructions 124 may utilize website browsing information to refine the search for products or services to be purchased. For example, if the user utters "buy this" while browsing a retailing website, the transaction preparation instructions 124 may utilize website browsing information to determine the product or service the user is viewing. It should be contemplated that the transaction preparation instructions 124 prepares and/or completes checkout of the determined product or service directly from the website (or the seller associated with the website) or from another seller that may not be associated with the website.

[063] In an implementation, the transaction preparation instructions 124 may utilize the profile information to select the product or service and/or the sellers from which the product

or service is to be purchased. As described below, the profile information may include preferred sellers, brands, style, size, or other parameters related to products or services that may be automatically or manually pre-set. The profile information may also include the types of items a user likes, qualities of items the user likes, the categories of items a user likes, minimum item rating requirements, item pricing requirements, user location and context information, shipping requirements, etc.The transaction preparation instructions 124 may select the product or service and the sellers (from which the product or service is to be purchased) based on the profile information. As an example, preferred retailers from which products or services is to be purchased and preferred brands of such products or services may be automatically pre-set by the system (e.g., pre-set to system preferred sellers and brands) until the defaults are manually modified by users. The default store, brand, style, size, or other parameters may be obtained (in response to an utterance indicative of a user's intent to purchase a product or service) to prepare and/or complete checkout of a product or service purchase unless the single utterance (or other information) specifies otherwise.

[064] In an implementation, selection of the product or service purchases by the transaction preparation instructions 124 may be limited to certain categories of products or services (e.g., no automobiles), a particular price range (e.g., no more than $100), etc., to reduce the number or severity of purchases related to fraud. The categories of product or services and/or the price ranges may, for instance, be automatically or manually pre-set (e.g., automatically preset by the system, manually pre-set by the user) and stored in the profile information.

[065] In one implementation, the transaction preparation instructions 124 may provide prospective transactions or offers to the user based on the user's profile information. For example, the transaction preparation instructions 124 may prepare a transaction for the user without any input from the user. In one implementation, the transaction preparation instructions 124 may analyze the user's profile information to determine any potential transaction opportunities, and provide a prospective transaction or offer related to the potential transaction opportunity. For example, in the case that voice commerce application 120 determines an upcoming anniversary of the user, the transaction preparation instructions 124 may prepare a prospective purchase for the user related to the anniversary. In another

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implementation, the transaction preparation instructions 124 may provide offers to the user related to purchases for the potential transaction opportunity.

[066] In an implementation, an administrator of the system 100 (or a subsystem thereof) may manage a set of predetermined sellers from whose inventories are searched for available products or services in response to a user input indicative of a user's intent to purchase. As an example, the administrator may specify a set of sellers that have priority over other sellers in having their products or services offered to users. Thus, a seller from which a product or service is to be purchased may be selected from the predetermined set of sellers specified by the administrator. Other criteria may, of course, be considered when selecting a seller with which a user is to complete a purchase transaction for a product or service.

[067] Checkout Management

[068] In an implementation, the checkout management instructions 126 may prepare and/or complete checkout of selected product or service purchases related to one or more user inputs. The checkout management instructions 126 may determine payment information that is to be used to pay for a selected product or service, shipping information that is to be used to deliver the selected product or service, and/or other information that is thereafter utilized to prepare and/or complete the purchase of the selected product or service. For example, the checkout management instructions 126 may utilize default payment information stored in the profile information for preparing or completing checkout of the selected product or service. Likewise, the checkout management instructions 126 may utilize default shipping information stored in the profile information for preparing or completing checkout of the selected product or service. In another implementation, the checkout management instructions 126 utilize an address book or contact list of the user stored in the profile information to provide shipping information for checkout of products or services for individuals other than the user. For example, a user input may reference an individual, other than the user, that is recognized by the user input processing instructions 122 (e.g., "Send flowers to my mom" wherein the user's mom is recognized as the intended recipient of the flowers). The checkout management instructions 126 may utilize the address book or contact list of the user to determine if the referenced individual's address is available for input as the shipping information.

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[069] In one implementation, the checkout management instructions 126 automatically complete the checkout of the product or service purchase. As an example, a single utterance from the user may result in the completion of checkout of the product or service without further input or approval from the user. In another implementation, the checkout management instructions 126 may present a request for confirmation of the determined product or service, shipping information, payment information, and/or other information to the user to solicit a confirmation from the user to complete the checkout of the product or service purchase. For example, the checkout management instructions 126 may prepare all of the aspects (e.g., payment information, shipping information, etc.) of checkout of the product or service purchase but wait until confirmation from the user to complete checkout.

[070] In an implementation, the checkout management instructions 126 may utilize user profile information for preparing and/or completing checkout of product or service purchases via a user input. In an implementation, the checkout management instructions 126 may utilize defaults associated with the user profile information, such as default payment information, default shipping information, etc., for preparing and/or completing checkout of product or service purchases. In another implementation, the checkout management instructions 126 utilize an address book or contact list of the user stored in the profile information to provide shipping information for checkout of products or services for individuals other than the user.

[071] Profile Management

[072] In an implementation, stored user profile information (e.g., name, payment information, shipping information, preferences, etc.) may be utilized by voice commerce application 120 for preparing and/or completing checkout of product or service purchases. In an implementation, profile management instructions 128 may automatically set defaults associated with the user profile information, such as default payment information, default shipping information, etc. In another implementation, profile management instructions 128 may automatically or manually pre-set profile information for preparing and/or completing checkout of product or service purchases. In an implementation, profile management instructions 128 enable the user to set profile information including default payment and shipping information utilized by the voice commerce application 120.

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[073] In an implementation, profile management instructions 128 may automatically or pre-set preferred sellers, brands, style, size, or other parameters related to products or services. As an example, preferred retailers or service providers from which products or services are to be purchased and preferred brands of such products or services may be automatically pre-set by the profile management instructions 128 (e.g., pre-set to system preferred sellers and brands) until the preferences are manually modified by users. The preferred store, brand, style, size, or other parameters may be obtained (in response to a single utterance) to prepare and/or complete checkout of a product or service purchase unless the single utterance (or other information) specifies otherwise. In an implementation, profile management instructions 128 enable the user to set preferred sellers, brands, style, size, or other parameters related to products or services utilized by the voice commerce application 120. The profile management instructions 128 may automatically or pre-set information relating to the general likes or dislikes of the user to determine a product or service to be purchased including the types of items a user likes, qualities of items the user likes, the categories of items a user likes, minimum item rating requirements, item pricing requirements, user location and context information, shipping requirements, etc.

[074] In an implementation, profile management instructions 128 may automatically or pre-set limits of checkout of product or service purchases to certain categories of products or services (e.g., no automobiles), a particular price range (e.g., no more than $100), etc., to reduce the number or severity of purchases related to fraud. The categories of product or services and/or the price ranges may, for instance, be automatically or manually pre-set (e.g., automatically preset by the system, manually pre-set by the user). In an implementation, profile management instructions 128 enable the user to set limits of checkout of product or service purchases to certain categories of products or services (e.g., no automobiles), a particular price range (e.g., no more than $100), or other criteria.

[075] In another implementation, profile management instructions 128 may store profile information relating to the user's personal information. For example, the profile information may include the user's address book or contact list, calendar, and other information which assist the voice commerce application 120 in determining products or services to be

purchased. In one implementation, the user's personal information may be pre-stored based on the registration information or otherwise set by the user.

[076] User Interface

[077] In an implementation, user interface instructions 129 may generate a voice commerce interface. The voice commerce interface may provide status information relating to the preparation and/or completion of checkout of product or service purchases. For example, the voice commerce interface may indicate to a user when checkout of product or service purchases is completed. In one implementation, the user interface instructions 129 may also provide the user with a request for confirmation to complete checkout of a product or service purchase. Examples of the voice commerce interface are illustrated with respect to FIGS. 5, 6A, and 5B.

[078] In an implementation, user interface instructions 129 may generate a profile information management interface. The profile management interface may allow the user to set profile information related to the purchase of products or services. For example, the profile management interface enables the user to set default payment and shipping information. The profile management interface may also enable the user to set preferred sellers, brands, style, size, or other parameters related to products or services as well as limits of certain categories of products or services and particular price ranges.

[079] Examples of System Architectures and Configurations

[080] Different system architectures may be used. For example, all or a portion of voice commerce application 120 may be executed on a user device. In other words, computing device 110 as illustrated may include a user device operated by the user. In implementations where all or a portion of voice commerce application 120 is executed on the user device, the user device may search remote information sources, prepare or complete checkout of product or service purchases, generate the interface, and/or perform other functions/operations of voice commerce application 120.

[081] All or a portion of voice commerce application 120 may be executed on a server device. In other words, computing device 110 as illustrated may include a server device that obtains a user request from a user device operated by the user. In implementations where all or a portion of voice commerce application 120 is executed on the server device, the server

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device may search remote information sources 140, obtain sets of results, prepare or complete checkout of product or service purchases, provide the interface to a user device, and/or perform other functions/operations of voice commerce application 120.

[082] Although illustrated in FIG. 1 as a single component, computer system 104 may include a plurality of individual components (e.g., computer devices) each programmed with at least some of the functions described herein. In this manner, some components of computer system 104 may perform some functions while other components may perform other functions, as would be appreciated. The one or more processors 112 may each include one or more physical processors that are programmed by computer program instructions. The various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as the processor(s) 112 are programmed to perform the functions described herein.

[083] It should be appreciated that although the various instructions are illustrated in FIG. 1 as being co-located within a single computing device 110, one or more instructions may be executed remotely from the other instructions. For example, some computing devices 110 of computer system 104 may be programmed by some instructions while other computing devices 110 may be programmed by other instructions, as would be appreciated. Furthermore, the various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as processor(s) 112 are programmed to perform the functions described herein.

[084] The description of the functionality provided by the different instructions described herein is for illustrative purposes, and is not intended to be limiting, as any of instructions may provide more or less functionality than is described. For example, one or more of the instructions may be eliminated, and some or all of its functionality may be provided by other ones of the instructions. As another example, processor(s) 112 may be programmed by one or more additional instructions that may perform some or all of the functionality attributed herein to one of the instructions.

[085] The various instructions described herein may be stored in a storage device 114, which may comprise random access memory (RAM), read only memory (ROM), and/or other memory. The storage device may store the computer program instructions (e.g., the

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aforementioned instructions) to be executed by processor(s) 112 as well as data that may be manipulated by processor(s) 112. The storage device may comprise floppy disks, hard disks, optical disks, tapes, or other storage media for storing computer-executable instructions and/or data.

[086] The various components illustrated in FIG. 1 may be coupled to at least one other component via a network 102, which may include any one or more of, for instance, the Internet, an intranet, a PAN (Personal Area Network), a LAN (Local Area Network), a WAN (Wide Area Network), a SAN (Storage Area Network), a MAN (Metropolitan Area Network), a wireless network, a cellular communications network, a Public Switched Telephone Network, and/or other network. In FIG. 1 and other drawing Figures, different numbers of entities than depicted may be used. Furthermore, according to various implementations, the components described herein may be implemented in hardware and/or software that configure hardware.

[087] User device(s) may include a device that can interact with computer system 104 through network 102. Such user device(s) may include, without limitation, a tablet computing device, a smartphone, a laptop computing device, a desktop computing device, a network-enabled appliance such as a "Smart" television, a vehicle computing device, and/or other device that may interact with computer system 104.

[088] The various databases 132 described herein may be, include, or interface to, for example, an Oracle™ relational database sold commercially by Oracle Corporation. Other databases, such as Informix™, DB2 (Database 2) or other data storage, including file-based (e.g., comma or tab separated files), or query formats, platforms, or resources such as OLAP (On Line Analytical Processing), SQL (Structured Query Language), a SAN (storage area network), Microsoft Access™, MySQL, PostgreSQL, HSpace, Apache Cassandra, MongoDB, Apache CouchDB™, or others may also be used, incorporated, or accessed. The database may comprise one or more such databases that reside in one or more physical devices and in one or more physical locations. The database may store a plurality of types of data and/or files and associated data or file descriptions, administrative information, or any other data. The database(s) 132 may be stored in storage device 114 and/or other storage that is accessible to computer system 104.

[089] **Example Flow Diagrams**

[090] The following flow diagrams describe operations that may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[091] FIG. 3 depicts a data flow diagram for a process 300 for providing voice commerce, according to an implementation of the invention. The various processing operations and/or data flows depicted in FIG. 3 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[092] In an operation 302, a natural language utterance of a user may be received. As an example, upon receipt, the natural language utterance may be processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine one or more products or services and/or other information (e.g., payment information, shipping information, seller information, associated cost information, etc.) that can be used to prepare and/or complete checkout of product or service purchases.

[093] In an operation 304, a product or service to be purchased on behalf of the user may be determined based on the natural language utterance. As an example, upon recognition of one or more words associated with the natural language utterance that are related to at least one product or service, the product/service-related words may be utilized to search one or more databases associated with one or more third party retailers and/or service providers,

and obtain results indicating one or more products or services. The results may then be processed, along with context information associated with the user, to select the most relevant product or service as the product or service that is to be purchased on behalf of the user.

[094] As illustrated by FIG. 3, in one implementation, the product or service that is to be purchased may be determined without any further user input after the receipt of the natural language utterance (from which the determination of the product or service to be purchased is based). In another implementation, the product or service that is to be purchased may be determined without further user input identifying the product or service after the receipt of the natural language utterance.

[095] In an operation 306, payment information that is to be used to pay for the product or service may be retrieved. As an example, default payment information associated with the user (e.g., for paying for product or services on behalf of the user) may be stored as profile information associated with the user. Such default payment may, for example, be retrieved from one or more databases storing the user's profile information, and utilized to pay for the product or service.

[096] In an operation 308, shipping information that is to be used to deliver the product or service may be retrieved. As an example, default shipping information associated with the user (e.g., for delivering products or services on behalf of the user) may be stored as profile information associated with the user. Such default shipping information may, for instance, retrieved from one or more databases storing the user's profile information, and be utilized to deliver the product or service.

[097] In an operation 310, a purchase transaction for the product or service may be completed based on the payment information and the shipping information.

[098] As illustrated by FIG. 3, in one implementation, the purchase transaction may be completed without any further user input after the receipt of the natural language utterance (from which the determination of the product or service to be purchased is based). In another implementation, the product or service that is to be purchased may be determined without further user input identifying the product or service, identifying the payment information, or identifying the shipping information after the receipt of the natural language utterance.

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[099] FIG. 4 depicts a data flow diagram for another process 400 for providing voice commerce, according to an implementation of the invention. The various processing operations and/or data flows depicted in FIG. 4 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[0100] As illustrated by FIG. 3, a natural language utterance of a user may be received, and a product or service that is to be purchased on behalf of the user may be determined based on the natural language utterance without further user input after the receipt of the natural language utterance. Payment information that is to be used to pay for the product or service, and shipping information that is to be used to deliver the product or service, may also be retrieved.

[0101] Referring back to FIG. 4, in an operation 402, a seller from which the product or service is to be purchased may be selected. As an example, the user may have specified a set of sellers from which the user prefers to purchase products or services. As such, the seller may be selected from the predetermined set of sellers specified by the user. As another example, an administrator of the system 100 (or of a subsystem of the system 100) may have specified a set of sellers that have priority over other sellers in having their products or services offered to users. Thus, the seller may be selected from the predetermined set of sellers specified by the administrator. As yet another example, a database of sellers may be queried to determine which seller has the product or service available for purchase. The sellers that have the product or service available for purchase may then be compared against one another to determine, for example, which seller has the lower price (or overall lower total purchase costs) for the product or service, which sellers has the highest customer rating, or other criteria in selecting the seller from which the product or service is to be purchased.

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[0102] In an operation 404, seller information associated with the selected seller may be retrieved. As an example, seller information may comprise a name of the seller, contact information associated with the seller, a price at which the seller will sell the product or service to the user, individual or overall costs involved with purchase of the product or service from the seller, a refund policy of the seller for the product or service, or other information.

[0103] In an operation 406, a request for user confirmation (to purchase the product or service from the seller and to use the payment information and the shipping information for a purchase transaction for the product or service) may be provided without further user input after the receipt of the utterance.

[0104] In an operation 408, it may be determined that the user has confirmed purchasing of the product or service from the seller and use of the payment information and the shipping information for the purchase transaction. As such, in an operation 410, the purchase transaction may be completed based on the seller information, the payment information, and the shipping information without further user input after the receipt of the utterance other than a user confirmation with respect to the confirmation request.

[0105] Example Screenshots

[0106] FIG. 5 illustrates a screenshot 502 of a user interface which facilitates voice commerce, according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. As shown in screenshot 502 of FIG. 5, a voice commerce application may enable the user to complete checkout of product or service purchases via a single utterance. As depicted in screenshot 502, the user may say “Send flowers to Betsy.” In response to receiving the utterance from the user, the voice commerce application may determine that flowers are to be purchased, and select a third party retailer from which to purchase the flowers. As an example, the user may have purchased a particular kind of flower (e.g., red roses) for Betsy numerous times in the past. As such, the particular kind of flower may be determined as the particular product that is to be purchased on behalf of the user for Betsy. The selection of the product may, for example, be performed without further user input identifying the product type (e.g., flowers) after the receipt of the utterance, without any further user input after the receipt of the utterance, etc.

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[0107] The voice commerce application may also determine the payment information to be used to pay for the flowers. Because the utterance indicates that the flowers are to be sent to Betsy, the voice commerce application may determine Betsy's address from the user's address book or contact list and provide Betsy's shipping information to the retailer. The voice commerce application may then, for example, complete a purchase transaction using seller information associated with the third party retailer, the payment information, the shipping information, or other information without further user input from the user. Upon completing the purchase transaction for the flowers, the voice commerce application may indicate that checkout for the flowers has been completed. In an implementation, the product to be purchased, a seller from which the product is to be purchased, payment information, shipping information, or other information may be displayed to the user.

[0108] FIGS. 6A and 6B illustrate screenshots 602 and 604 of another user interface which facilitates voice commerce, according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. As shown in screenshot 602 of FIG. 6A, a voice commerce application may solicit a user confirmation from a user with respect to a product purchase before completing checkout of the product purchase. As depicted in screenshot 602, the user may say "Send flowers to Betsy." In response to receiving the single utterance from the user, the voice commerce application may determine that flowers are to be purchased, and select a third party retailer from which to purchase the flowers. The voice commerce application may also determine the payment information to be used to pay for the flowers. Because the utterance indicates that the flowers are be sent to Betsy, the voice commerce application may determine Betsy's address from the user's address book or contact list and provide Betsy's shipping information to the retailer. The voice commerce application may then present a request for user confirmation of the purchase to the user (e.g., without further user input after the receipt of the utterance). As shown in screenshot 604, the user may confirm purchase of the flowers by saying "Yes." Upon confirmation of the purchase, the voice commerce application may indicate that checkout for the flowers has been completed.

[0109] FIG. 7A illustrates a screenshot 702 of a user interface which facilitates management of user profile information, according to an implementation of the invention. The described

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screenshots may be accomplished using some or all of the system components described in detail above. As shown in screenshot 702, the user profile information interface includes the user name, default payment information, and default shipping information. The user may edit any data fields associated with the user name, default payment information, and default shipping information.

[0110] FIG. 7B illustrates a screenshot 704 of another user interface which facilitates management of user profile information, according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. As shown in screenshot 704, the user profile information interface may enable the user to pre-set preferences of different products and/or services to be purchased. The profile information interface includes a product/service category that may be selected by the user. For each product/service category, the user may select preferred sellers, preferred brands, preferred styles, preferred sizes, and other parameters related to the products/services to be selected. The user may also limit certain categories of products or services to a particular price range. The user may edit any data field associated with product/service category to include preferred retail stores/service providers, preferred brands, preferred styles, preferred sizes, and price ranges.

[0111] Other implementations, uses and advantages of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. The specification should be considered exemplary only, and the scope of the invention is accordingly intended to be limited only by the following claims.

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What is claimed is:

1. A method for providing voice commerce, the method being implemented on a computer system having one or more physical processors programmed with computer program instructions which, when executed, perform the method, the method comprising:

receiving, at the computer system, a user input comprising a natural language utterance;

determining, by the computer system, without further user input after the receipt of the user input, a product or service based on the natural language utterance that is to be purchased on behalf of a user;

obtaining, by the computer system, payment information with which to pay for the product or service;

obtaining, by the computer system, shipping information with which to deliver the product or service; and

completing, by the computer system, without further user input after the receipt of the user input, a purchase transaction for the product or service based on the payment information and shipping information.

2. The method of claim 1, further comprising:

selecting, by the computer system, a seller from which the product or service is to be purchased; and

obtaining, by the computer system, seller information associated with the seller,

wherein completing the purchase transaction comprises completing, without further user input after the receipt of the user input, the purchase transaction based on the seller information, the payment information, and the shipping information.

3. The method of claim 2, wherein the seller information comprises a price at which the seller will sell the product or service, and wherein completing the purchase transaction comprises completing, without further user input after the receipt of the user input, the purchase transaction based on the price, the payment information, and the shipping information.

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4. The method of claim 2, wherein selecting the seller comprises selecting the seller based on the price at which the seller will sell the product or service.

5. The method of claim 2, further comprising:

obtaining, by the computer system, user profile information associated with the user, wherein the user profile information indicates a predetermined set of sellers specified by the user,

wherein selecting the seller comprises selecting the seller from the predetermined set of user-specified sellers indicated by the user profile information.

6. The method of claim 2, further comprising:

obtaining, by the computer system, a predetermined set of sellers specified by an administrator of the system that is different than the user,

wherein selecting the seller comprises selecting the seller from the predetermined set of administrator-specified sellers.

7. The method of claim 1, further comprising:

obtaining, by the computer system, user profile information associated with the user, wherein the user profile information comprises at least one of default payment information that is to be used to pay for products or services on behalf of the user or default shipping information that is to be used to delivery products or services on behalf of the user,

wherein at least one of: (i) obtaining the payment information comprises selecting the default payment information to pay for the product or service; or (ii) obtaining the shipping information comprises selecting the default shipping information to deliver the product or service, and

wherein completing the purchase transaction comprises completing, without further user input after the receipt of the user input, the purchase transaction based on at least one of the default payment information or the default shipping information.

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8. The method of claim 1, further comprising:

receiving, at the computer system, a previous user input prior to the receipt of the user input, wherein the previous user input is related to the product or service; and

storing, by the computer system, context information associated with the user based on information related to the previous user input,

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, without further user input after the receipt of the user input, the product or service based on the natural language utterance and the context information related to the previous user input.

9. The method of claim 8, further comprising:

performing, by the computer system, speech recognition on the previous user input to recognize one or more words associated with the previous user input; and

identifying, by the computer system, the product or service as at least one product or service related to the previous user input based on the one or more recognized words,

wherein storing the context information comprises storing product information identifying the product or service based on the identification of the product or service as related to the previous user input such that the context information comprises the product information, and

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, without further user input after the receipt of the user input, the product or service based on the natural language utterance and the product information.

10. The method of claim 1, further comprising:

performing, by the computer system, speech recognition on the natural language utterance to recognize one or more words associated with the natural language utterance, wherein the one or more recognized words identify at least one of the product or service or a product or service type,

wherein determining the product or service as at least one product or service to be

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purchased on behalf of the user comprises determining, based on the one or more recognized words, without further user input after the receipt of the user input, the product or service as at least one product or service to be purchased on behalf of the user.

11. The method of claim 1, further comprising:

performing, by the computer system, speech recognition on the natural language utterance to recognize one or more words associated with the natural language utterance, wherein the one or more recognized words by themselves do not indicate the product or service or a product or service type,

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, based on the one or more recognized words, without further user input after the receipt of the user input, the product or service as at least one product or service to be purchased on behalf of the user.

12. The method of claim 11, further comprising:

receiving, at the computer system, a previous user input prior to the receipt of the user input, wherein the previous user input is related to the product or service,

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, based on the previous user input, without further user input after the receipt of the user input, the product or service as at least one product or service to be purchased on behalf of the user.

13. The method of claim 1, further comprising:

obtaining, by the computer system, user profile information associated with the user, wherein the user profile information indicates one or more pre-approved categories of products or services;

determining whether the product or service is associated with at least one of the one or more pre-approved categories;

wherein completing the purchase transaction comprises completing, without further user input after the receipt of the user input, the purchase transaction based on the payment

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information, the shipping information, and a determination that the product or service is associated with at least one of the one or more pre-approved categories.

14. The method of claim 1, further comprising:

obtaining, by the computer system, user profile information associated with the user, wherein the user profile information indicates a pre-approved cost threshold;

determining whether a cost related to purchasing the product or service satisfies the pre-approved cost threshold;

wherein completing the purchase transaction comprises completing, without further user input after the receipt of the user input, the purchase transaction based on the payment information, the shipping information, and a determination that the cost related to purchasing product or service satisfies the pre-approved cost threshold.

15. A system for providing voice commerce, the system comprising:

one or more physical processors programmed with computer program instructions which, when executed, cause the one or more physical processors to:

receive a user input comprising a natural language utterance;

determine, without further user input after the receipt of the user input, a product or service based on the natural language utterance that is to be purchased on behalf of a user;

obtain payment information with which to pay for the product or service;

obtain shipping information with which to deliver the product or service; and

complete, without further user input after the receipt of the user input, a purchase transaction for the product or service based on the payment information and shipping information.

16. The system of claim 15, wherein the one or more physical processors are further caused to:

select a seller from which the product or service is to be purchased; and

obtain seller information associated with the seller,

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wherein completing the purchase transaction comprises completing, without further user input after the receipt of the user input, the purchase transaction based on the seller information, the payment information, and the shipping information.

17. The system of claim 16, wherein the seller information comprises a price at which the seller will sell the product or service, and wherein completing the purchase transaction comprises completing, without further user input after the receipt of the user input, the purchase transaction based on the price, the payment information, and the shipping information.

18. The system of claim 16, wherein selecting the seller comprises selecting the seller based on the price at which the seller will sell the product or service.

19. The system of claim 16, wherein the one or more physical processors are further caused to:

obtain user profile information associated with the user, wherein the user profile information indicates a predetermined set of sellers specified by the user,

wherein selecting the seller comprises selecting the seller from the predetermined set of user-specified sellers indicated by the user profile information.

20. The system of claim 16, wherein the one or more physical processors are further caused to:

obtain a predetermined set of sellers specified by an administrator of the system that is different than the user,

wherein selecting the seller comprises selecting the seller from the predetermined set of administrator-specified sellers.

21. The system of claim 15, wherein the one or more physical processors are further caused to:

receive a previous user input prior to the receipt of the user input, wherein the

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previous user input is related to the product or service; and

store context information associated with the user based on information related to the previous user input,

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, without further user input after the receipt of the user input, the product or service based on the natural language utterance and the context information related to the previous user input.

22. The system of claim 21, wherein the one or more physical processors are further caused to:

perform speech recognition on the previous user input to recognize one or more words associated with the previous user input; and

identify the product or service as at least one product or service related to the previous user input based on the one or more recognized words,

wherein storing the context information comprises storing product information identifying the product or service based on the identification of the product or service as related to the previous user input such that the context information comprises the product information, and

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, without further user input after the receipt of the user input, the product or service based on the natural language utterance and the product information.

23. The system of claim 15, wherein the one or more physical processors are further caused to:

perform speech recognition on the natural language utterance to recognize one or more words associated with the natural language utterance, wherein the one or more recognized words by themselves do not indicate the product or service or a product or service type,

wherein determining the product or service as at least one product or service to be

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purchased on behalf of the user comprises determining, based on the one or more recognized words, without further user input after the receipt of the user input, the product or service as at least one product or service to be purchased on behalf of the user.

24. The system of claim 23, wherein the one or more physical processors are further caused to:

receive a previous user input prior to the receipt of the user input, wherein the previous user input is related to the product or service,

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, based on the previous user input, without further user input after the receipt of the user input, the product or service as at least one product or service to be purchased on behalf of the user.

25. A system for providing voice commerce, the system comprising:

one or more physical processors programmed with computer program instructions which, when executed, cause the one or more physical processors to:

receive a user input comprising a natural language utterance;

determine, without further user input after the receipt of the user input, the product or service based on the natural language utterance that is to be purchased on behalf of the user;

obtain payment information with which to pay for the product or service;

obtain shipping information with which to deliver the product or service; and

provide, without further user input after the receipt of the user input, a request for user confirmation to use the payment information and the shipping information for a purchase transaction for the product or service.

26. The system of claim 25, wherein the one or more physical processors are further caused to:

determine whether the user has confirmed use of the payment information and the shipping information for the purchase transaction; and

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complete, without further user input after the receipt of the user input other than a user confirmation with respect to the confirmation request, the purchase transaction based on the payment information, the shipping information, and a determination that the user has confirmed use of the payment information and the shipping information.

27. The system of claim 25, wherein the one or more physical processors are further caused to:

select a seller from which the product or service is to be purchased; and

obtain seller information associated with the seller,

wherein providing the confirmation request comprises providing, without further user input after the receipt of the user input, a request for user confirmation to purchase the product or service from the seller and to use the payment information and the shipping information for the purchase transaction.

28. The system of claim 25, wherein the one or more physical processors are further caused to:

receive a previous user input prior to the receipt of the user input, wherein the previous user input is related to the product or service; and

store context information associated with the user based on information related to the previous user input,

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, without further user input after the receipt of the user input, the product or service based on the natural language utterance and the context information related to the previous user input.

29. The system of claim 28, wherein the one or more physical processors are further caused to:

perform speech recognition on the previous user input to recognize one or more words associated with the previous user input; and

identify the product or service as at least one product or service related to the previous

user input based on the one or more recognized words,

wherein storing the context information comprises storing product information identifying the product or service based on the identification of the product or service as related to the previous user input such that the context information comprises the product information, and

wherein determining the product or service as at least one product or service to be purchased on behalf of the user comprises determining, without further user input after the receipt of the user input, the product or service based on the natural language utterance and the product information.

30. A system for providing voice commerce, the system comprising:

one or more physical processors programmed with computer program instructions which, when executed, cause the one or more physical processors to:

receive a user input comprising a natural language utterance;

determine, without further user input identifying a product or service after the receipt of the user input, a first product or service based on the natural language utterance that is to be purchased on behalf of a user;

obtain, without further user input identifying payment information after the receipt of the user input, first payment information with which to pay for the product or service;

obtain, without further user input identifying shipping information after the receipt of the user input, first shipping information with which to deliver the product or service; and

complete, without further user input identifying a product or service, payment information, or shipping information after the receipt of the user input, a purchase transaction for the first product or service based on the first payment information and the first shipping information.

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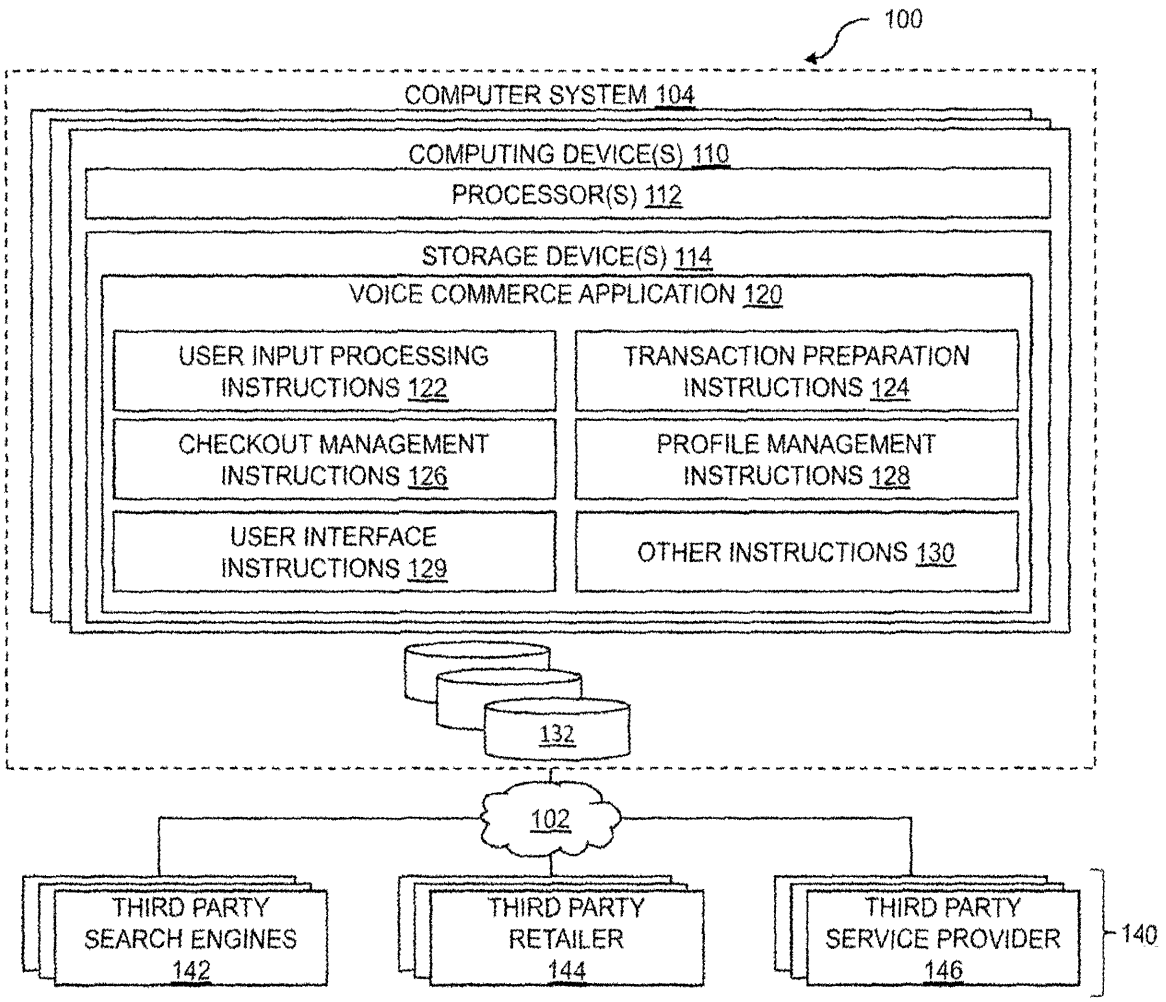

100
COMPUTER SYSTEM 104
COMPUTING DEVICE(S) 110
PROCESSOR(S) 112
STORAGE DEVICE(S) 114
VOICE COMMERCE APPLICATION 120
USER INPUT PROCESSING INSTRUCTIONS 122
TRANSACTION PREPARATION INSTRUCTIONS 124
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USER INTERFACE INSTRUCTIONS 129
OTHER INSTRUCTIONS 130
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THIRD PARTY SEARCH ENGINES 142
THIRD PARTY RETAILER 144
THIRD PARTY SERVICE PROVIDER 146
140

FIG. 1

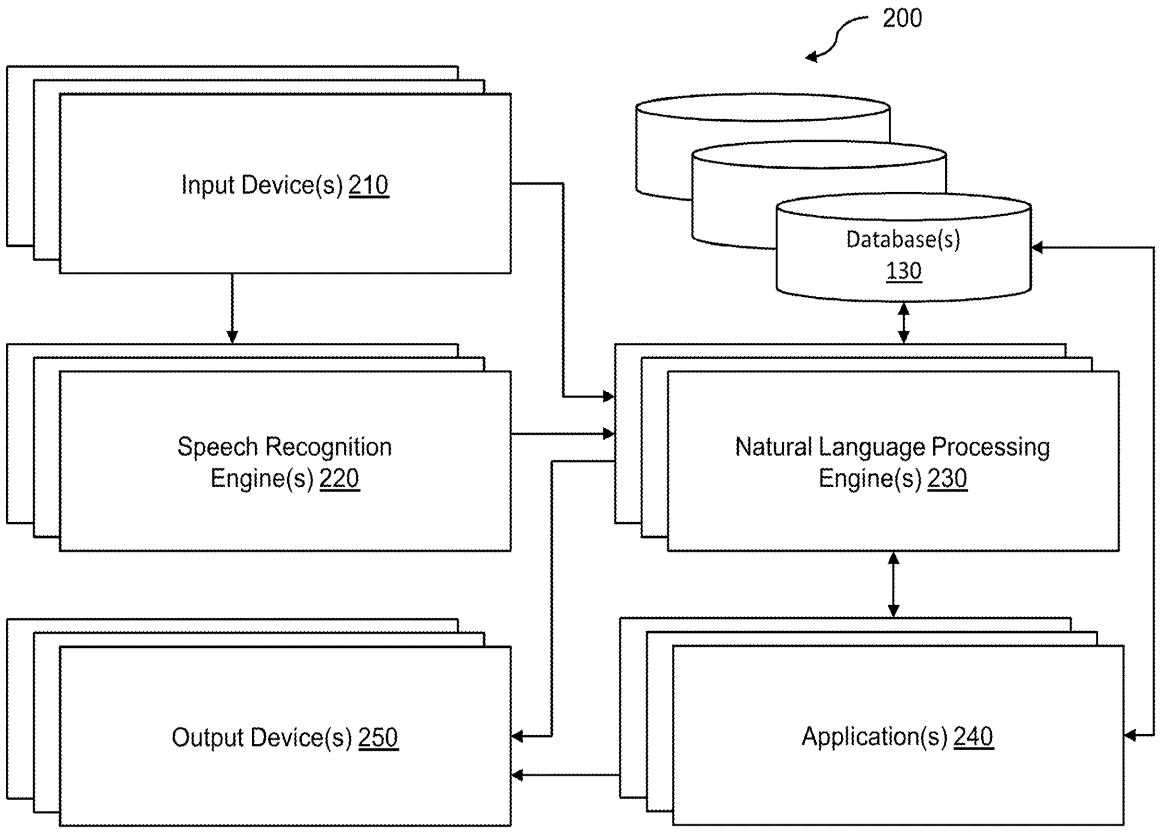

200
Input Device(s) 210
Database(s) 130
Speech Recognition Engine(s) 220
Natural Language Processing Engine(s) 230
Output Device(s) 250
Application(s) 240

FIG. 2

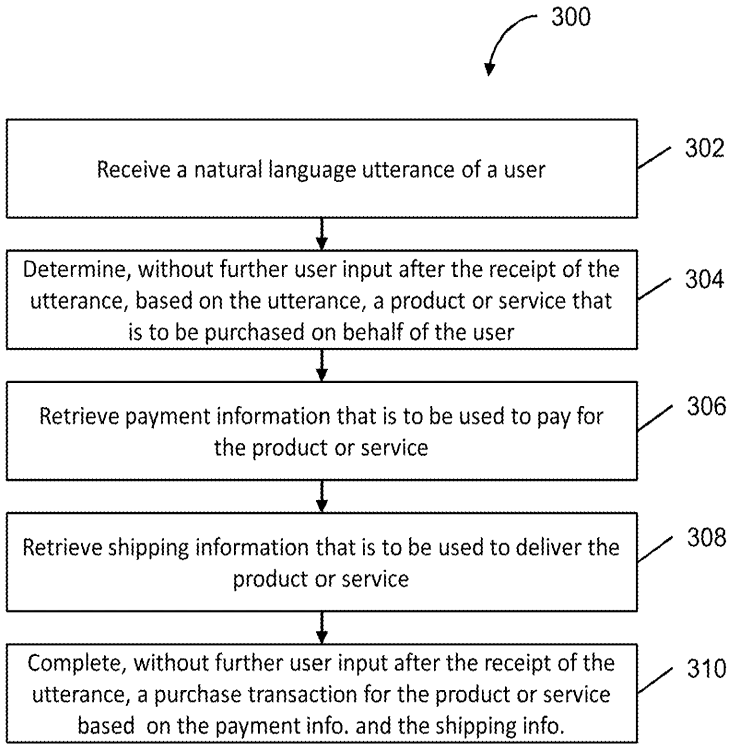


FIG. 3

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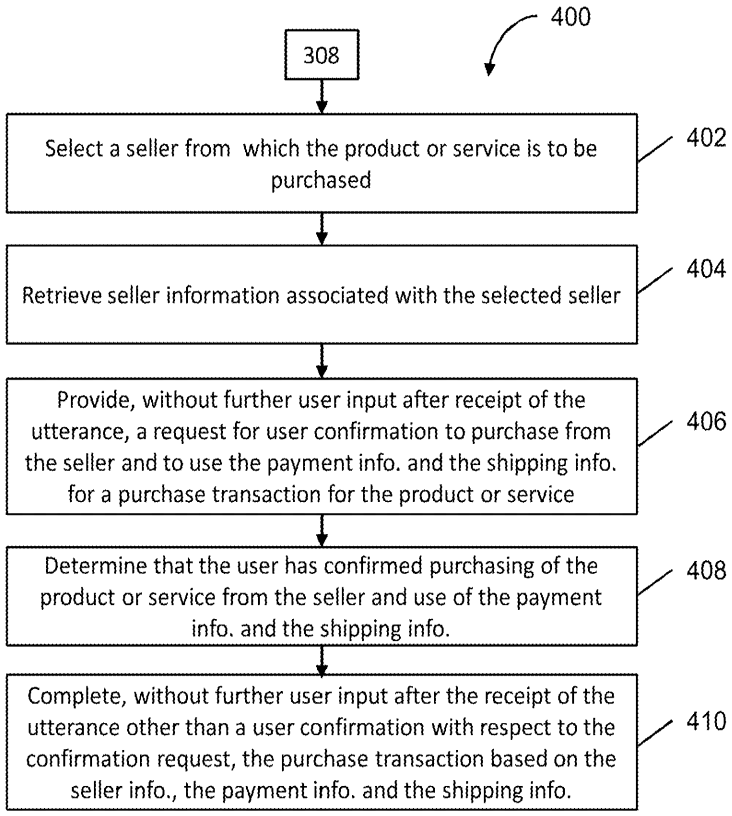

400
308
Select a seller from which the product or service is to be purchased
402
Retrieve seller information associated with the selected seller
404
Provide, without further user input after receipt of the utterance, a request for user confirmation to purchase from the seller and to use the payment info. and the shipping info. for a purchase transaction for the product or service
406
Determine that the user has confirmed purchasing of the product or service from the seller and use of the payment info. and the shipping info.
408
Complete, without further user input after the receipt of the utterance other than a user confirmation with respect to the confirmation request, the purchase transaction based on the seller info., the payment info. and the shipping info.
410

FIG. 4

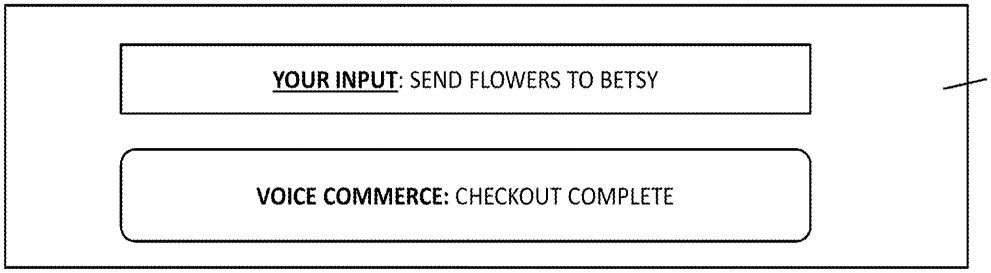


FIG. 5

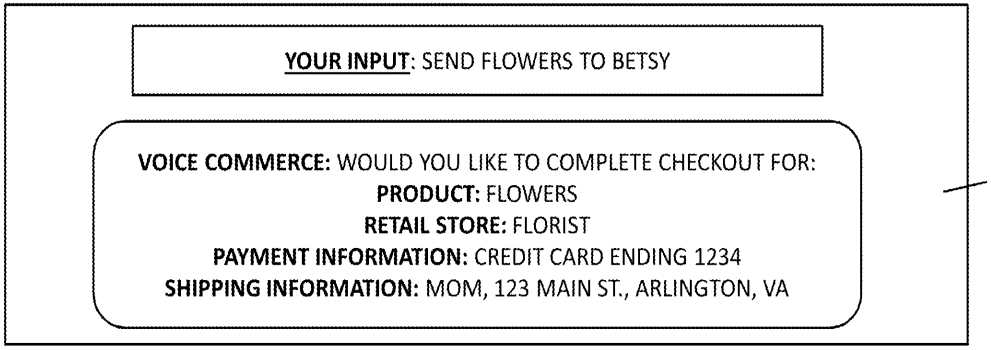


FIG. 6A

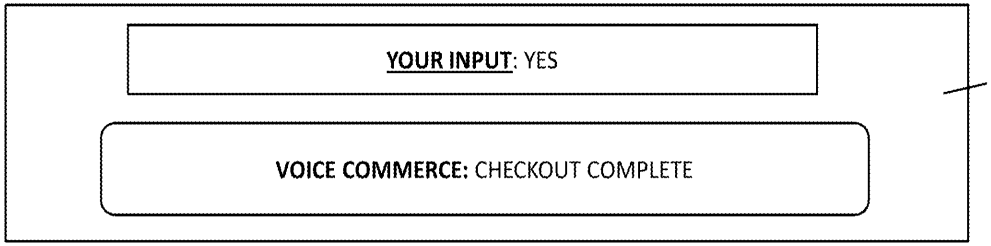


FIG. 6B

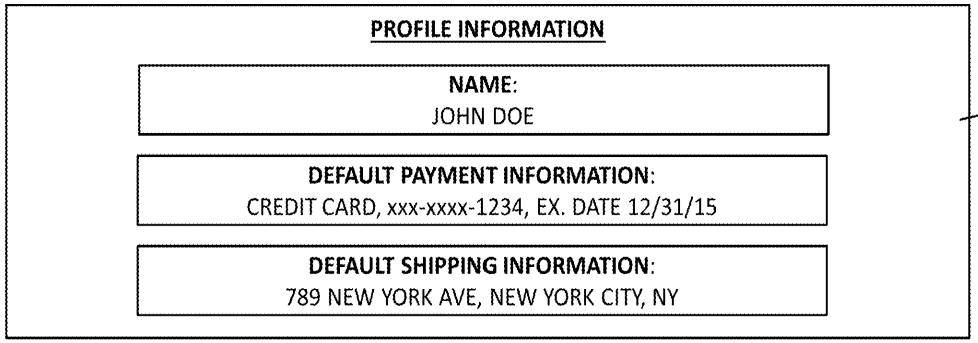

PROFILE INFORMATION
NAME:
JOHN DOE
DEFAULT PAYMENT INFORMATION:
CREDIT CARD, xxx-xxxx-1234, EX. DATE 12/31/15
DEFAULT SHIPPING INFORMATION:
789 NEW YORK AVE, NEW YORK CITY, NY
702

FIG. 7A

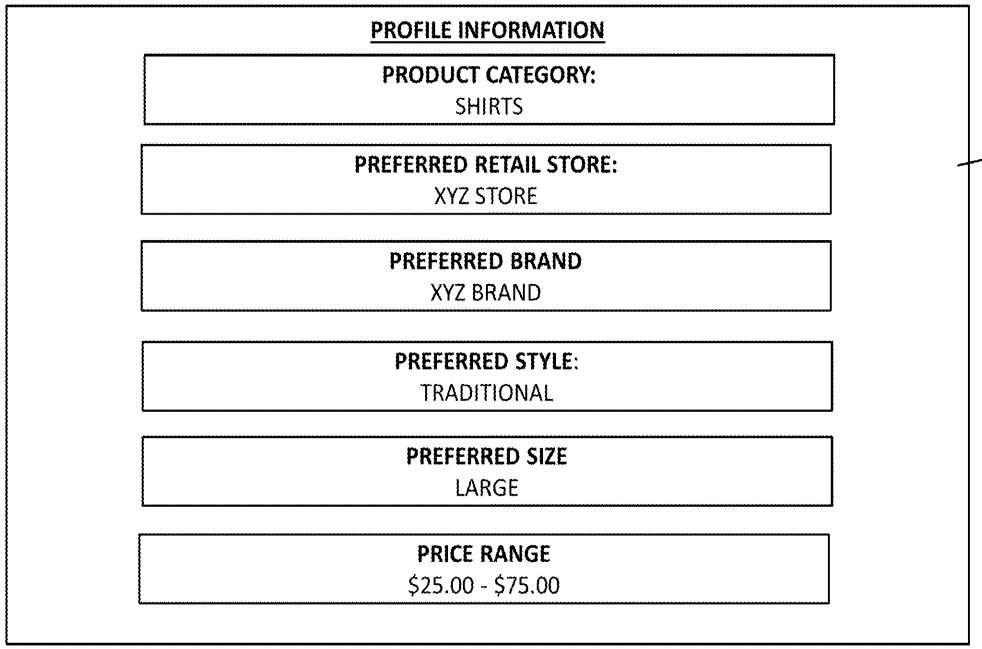

PROFILE INFORMATION
PRODUCT CATEGORY:
SHIRTS
PREFERRED RETAIL STORE:
XYZ STORE
PREFERRED BRAND
XYZ BRAND
PREFERRED STYLE:
TRADITIONAL
PREFERRED SIZE
LARGE
PRICE RANGE
$25.00 - $75.00
704

FIG. 7B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/050218

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 17/27 (2015.01)
CPC - G06f 17/2785 (2015.10)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - G06F 17/27, G10L 21/00, 25/00 (2015.01)
USPC - 704/9, 246, 275

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - G06F 17/271, 17/274, 17/2785 (2015.10) (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Orbit, Google Patents, Google
Search terms used: natural, language, command, order, products, semantic, search, gps, contacts, profile

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/0060625 A1 (DAVIS et al) 07 March 2013 (07.03.2013) entire document	1-3, 7-12, 14-17, & 21-30

Y		4-6, 13, & 18-20
Y	US 2013/0311324 A1 (LUVOCRACY INC) 21 November 2013 (21.11.2013) entire document	4-6, 13, & 18-20
A	US 8,112,275 B2 (KENNEWICK et al) 07 February 2012 (07.02.2012) entire document	1-30
A	US 2008/0189110 A1 (FREEMAN et al) 07 August 2008 (07.08.2008) entire document	1-30

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 October 2015	10 DEC 2015
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Blaine Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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(72) Inventors; and
(71) Applicants : **KENNEWICK, Michael, R., Sr.** [US/US]; 13407 NE 37th Place, Bellevue, WA 98075 (US). **CARTER, Daniel, B.** [US/US]; 23718 NE 43rd Street, Redmond, WA 98053 (US).

(74) Agents: **KOO, Hean, L.** et al.; Sheppard Mullin Richter & Hampton LLP, 2099 Pennsylvania Avenue, N.W., Suite 100, Washington, DC 20006 (US).

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Published:
— *with international search report (Art. 21(3))*

(54) **Title**: SYSTEM AND METHOD OF MARKETING OF REMINDERS

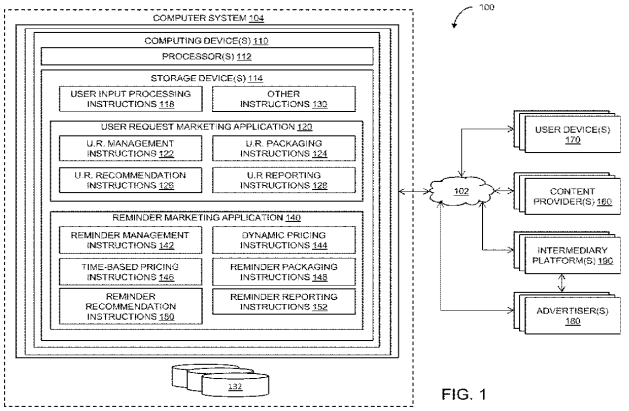


FIG. 1

(57) **Abstract**: In certain implementations, advertisers may be enabled to determine in real-time whether to include their advertisements (or other content) with reminders. As an example, the advertisement opportunity may be provided to the advertisers upon creation of the reminder. The advertisement opportunity may, for instance, comprise an opportunity to purchase an ad placement associated with the reminder. Upon determining that an advertiser purchased the associated ad placement, the associated ad placement may be allocated for an advertisement associated with the advertiser so that an advertisement associated with the advertiser may be presented with the reminder upon a triggering event indicating that the reminder should be presented to the user. When the reminder is provided for presentation to the user, a particular advertisement associated with the advertiser may be presented to the user.

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System and Method of Marketing of Reminders

CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 62/051,282 filed September 16, 2014 entitled "SYSTEM AND METHOD OF MARKETING OF REMINDERS" and U.S. Provisional Patent Application Serial No. 62/051,288 filed September 16, 2014 entitled "SYSTEM AND METHOD OF MARKETING OF USER REQUESTS", the entireties of which are incorporated herein by reference.

FIELD OF THE INVENTION

[002] The invention relates to systems and methods of marketing of user requests and/or reminders (or other notifications).

BACKGROUND OF THE INVENTION

[003] Electronic user devices have emerged to become nearly ubiquitous in the everyday lives of many people. One of the reasons for this increased use is the convenience of receiving information with a user device. In an increasing global marketplace, advertisers are continually looking for new and effective ways to reach consumers. Recent technological advances in advertising include, for example, real-time bidding (RTB) of ad placements such that ad inventory is bought and sold on a per-impression basis. Typical ad bidding systems, however, do not provide advertisers with opportunities to purchase ad placements associated with individual user requests and/or reminders (or other notifications). These and other drawbacks exist.

SUMMARY OF THE INVENTION

[004] The invention relates to systems and methods of marketing of user requests and/or reminders (or other notifications). As an example, with respect to marketing of reminders, advertisers may be enabled to determine in real-time whether to include their advertisements (or other content) with reminders. To assist the advertisers in making such determinations, information about the reminders may be determined, and made available to the advertisers

along with the advertisement opportunity (to include their advertisements with the reminders. Such information may, for instance, comprise a category related to a reminder, a location related to the reminder, a time related to the reminder, a device type of a device at which the reminder was made or at which the reminder will potentially be presented to a user, or other information. As used herein, an advertiser may comprise a business that is promoting their products or services, an independent marketer that is promoting products or services of other businesses, or other entity that is promoting products or services.

[005] In an implementation, an advertisement opportunity associated with a reminder of a user may be provided to one or more advertisers (e.g., via a real-time bidding system). As an example, the advertisement opportunity may be provided to the advertisers upon creation of the reminder (e.g., without the need for further user input after creation of the reminder). , and may comprise an opportunity to purchase an ad placement associated with the reminder. Upon determining that an advertiser purchased the associated ad placement, the associated ad placement may be allocated for an advertisement associated with the advertiser so that an advertisement associated with the advertiser may be presented with the reminder upon a triggering event indicating that the reminder should be presented to the user. Thus, when the reminder is provided for presentation to the user, a particular advertisement associated with the advertiser may also be presented to the user.

[006] In an implementation, a reminder may be created based on a natural language input (e.g., utterance, gesture, etc.) of a user. As an example, if the user input is a natural language utterance spoken by the user, the utterance may be processed by a speech recognition engine to recognize one or more words of the utterance. The recognized words may then be processed (e.g., along with context information associated with the user) by a natural language processing engine to determine a user request intended by the user when the user spoke the utterance. In one use case, upon a determination that the user intends to create a reminder, the reminder is created on behalf of the user. In another use case, the determined user request may not specify creation of a reminder. Nevertheless, a need for a particular reminder may be predicted based on the processing of the natural language utterance. As a result, the reminder may be created on behalf of the user even though the user may not have intended to create the reminder (e.g., a reminder for his wedding anniversary may be created

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when the user has a conversation specifying a date or other time frame regarding his wedding anniversary).

[007] In an implementation, as a result of the processing of the recognized words and/or the context information, one or more categories related to the utterance (e.g., product category, service category, etc.), entity associations related to the utterance (e.g., organization name, brand name, etc.,), product or service names related to the utterance, or other information may be determined. In one scenario, such information (determined based on the processing of the recognized words and/or context information) may be provided with (or included as part of) an advertisement opportunity associated with the reminder (that is created based on the utterance) to assist the advertisers in determining whether to include their advertisements (or other content) with the reminder.

[008] In another scenario, such information (determined based on the processing of the recognized words and/or context information) may be utilized to select advertisers that are to be provided with an advertisement opportunity to include their advertisements (or other context) with the reminder (that is created based on the utterance). For example, the selection of the advertisers to be provided with the advertisement opportunity may be based on the likelihood (or the extent) that an advertiser would be interested in placing their advertisement with the reminder. Comparison of information regarding the advertisers (e.g., products or services offered by the advertisers, categories in which the advertisers have explicitly indicated interest, locations in or times during which the advertisers would like to promote their products or services, devices types with which the advertisers would like to promote their products or services, etc.) and information related to the utterance may, for instance, be performed to facilitate the selection of the advertisers to be provided with the advertisement opportunity.

[009] Various other aspects of the invention will be apparent through the detailed description of the invention and the drawings attached hereto. It is also to be understood that both the foregoing general description and the following detailed description are exemplary and not restrictive of the scope of the invention. As used in the specification and in the claims, the singular form of “a”, “an”, and “the” include plural referents unless the context clearly dictates otherwise. In addition, as used in the specification and the claims, the term “or” means “and/or” unless the context clearly dictates otherwise.

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BRIEF DESCRIPTION OF THE DRAWINGS

[010] FIG. 1 illustrates a system for marketing of user requests and/or reminders, according to an implementation of the invention.

[011] FIG. 2 illustrates a system for facilitating natural language processing, according to an implementation of the invention.

[012] FIG. 3 illustrates a data flow for a process of marketing user requests, according to an implementation of the invention.

[013] FIG. 4 illustrates a data flow for a process of marketing reminders, according to an implementation of the invention.

[014] FIG. 5 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with user requests, according to an implementation of the invention.

[015] FIG. 6 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with reminders, according to an implementation of the invention.

[016] FIG. 7 illustrates a screenshot of a user interface which provides an advertisement associated with an advertiser that purchased an ad placement associated with a user request, according to an implementation of the invention.

[017] FIG. 8 illustrates a screenshot of a user interface which provides an advertisement associated with an advertiser that purchased an ad placement associated with a reminder, according to an implementation of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[018] In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the implementations of the invention. It will be appreciated, however, by those having skill in the art that the implementations of the invention may be practiced without these specific details or with an equivalent arrangement. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the implementations of the invention.

[019] FIG. 1 illustrates a system 100 of marketing of user requests and/or reminders, according to an implementation of the invention. A user request may comprise a command, a

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query, or other user request. A reminder may relate to scheduled appointments, task deadlines, relevant dates/times, relevant user needs, or other items. Reminders may be created by users or automatically on behalf of users. As an example, a user may initiate creation of a reminder by submitting a user request specifying creating of the reminder. In another example, system 100 may automatically create a reminder on behalf of a user without a user request that specifies creation of the reminder. System 100 may, for instance, predict a need for a reminder for a user based on information about the user, such as the user's birthday, anniversary, appointments or other scheduled events, user requests submitted by the user (e.g., requests that do not necessarily specify creation of the reminder), or other information.

[020] In an implementation, system 100 may provide one or more advertisement opportunities associated with one or more user requests and/or reminders (or other notifications) to one or more advertisers to facilitate purchase of ad placements with the user requests and/or reminders. As an example, the advertisement opportunities may comprise an opportunity to purchase an ad placement associated with a user request, an opportunity to purchase an ad placement associated with a reminder, or other opportunity. The advertisers may comprise businesses that are promoting their products or services, independent marketers that are promoting products or services of other businesses, or other entities that are promoting products or services.

[021] In one use case, if an advertiser purchases an ad placement associated with a user request, the associated ad placement may be allocated for one or more advertisements associated with the purchasing advertiser such that an advertisement associated with the purchasing advertiser may be provided for presentation to the user as at least part of a response to the user request.

[022] In another use case, if an advertiser purchases an ad placement associated with a reminder, the associated ad placement may be allocated for one or more advertisements associated with the purchasing advertiser such that an advertisement associated with the purchasing advertiser may be provided for presentation to the user with the reminder. An advertisement associated with the purchasing advertiser may, for instance, be presented to the user with the reminder upon receipt of an indication to present the reminder to the user

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(e.g., a user request to view the reminder, an automated trigger event to present the reminder to the user, or other indication).

[023] In an implementation, system 100 may provide advertisers an opportunity to purchase real-time ad placements associated with user requests. For example, upon receipt a user input indicating a user request, system 100 may provide an opportunity to purchase an ad placement associated with the user request to one or more advertiser, and allocate the associated ad placement for an advertisement associated with a purchasing advertiser. System 100 may then provide a response to a user request of a user for presentation to the user such that the response comprises a first portion that addresses the user request of the user and a second portion that includes an advertisement associated with the purchasing advertiser. As such, before a response comprising a portion that addresses a user request of a user is provided for presentation to the user: (i) an opportunity to purchase an ad placement associated with the user request may be provided to an advertiser; and/or (ii) the associated ad placement may be allocated for an advertisement associated with the advertiser (e.g., upon the advertiser purchasing an associated ad placement) such that the response further comprises an advertisement associated with the advertiser when the response is provided for presentation to the user.

[024] In an implementation, an advertiser may purchase an ad placement (e.g., associated with a user request, associated with a reminder, etc.) by accepting an active offer for the ad placement, by submitting the highest bid during an auction for the ad placement, etc. In some implementations, purchasing of an ad placement by an advertiser may comprise an intermediary (e.g., using an intermediary platform) accepting an active offer for the ad placement or submitting the highest bid for the ad placement on behalf of the advertiser (e.g., based on a pre-negotiated agreement between the intermediary and the advertiser).

[025] In an implementation, an advertisement opportunity associated with a user request or a reminder may be provided to one or more advertisers based on a category associated with the user request or the reminder, a location associated with the user request or the reminder, a time associated with the user request or the reminder, a device type of a device at which the user request or a request for the reminder was made, a device type of a device at which a response to the user request or the reminder will potentially be presented to the user, or other parameter. In one scenario, for example, advertisers may be selected to receive the

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advertisement opportunity based on the likelihood (or the extent) that an advertiser would be interested in placing their advertisement as part of a response to the user request or with the reminder. Comparison of information regarding the advertisers and information related to the user request or the reminder may, for instance, be performed to facilitate the selection of the advertisers that are to receive the advertisement opportunity. As an example, information regarding the advertisers may comprise products or services offered by the advertisers, categories in which the advertisers have explicitly indicated interest, locations in or times during which the advertisers would like to promote their products or services, devices types (e.g., device operating system, device form factor, etc.) with which the advertisers would like to promote their products or services, or other information.

[026] In another scenario, advertisers may indicate or be assigned to one or more categories of advertisement opportunities to facilitate distribution of advertisement opportunities to the advertisers. As an example, the indicated or assigned categories of each advertiser may be considered as at least one factor in determining which advertisement opportunities are to be provided to the advertiser (e.g., by determining the likelihood that the advertiser would purchase an ad placement associated with the advertisement opportunity). As another example, the indicated or assigned categories may be utilized to distribute advertisement opportunities to advertisers such that the advertisers only receive advertisement opportunities related to categories in which they have explicitly indicated interest or to which they have been assigned.

[027] In an implementation, a purchase of an ad placement associated with a user request or a reminder by an advertiser may be based on a category associated the user request or the reminder, a location associated with the user request or the reminder, a time associated with the user request or the reminder, a device type of a device at which the user request or a request for the reminder is made, a device type of a device at which a response to the user request or the reminder will potentially be presented to the user, or other parameter. In one use case, for example, an intermediary platform (e.g., demand side platform) associated with a pizza restaurant may automatically accept offers of ad placements with user requests for food when the user requests are made from Sunday through Thursday (e.g., during which the pizza restaurant may be in need of customers), the user requests are made within 3 miles of the pizza restaurant, and the price of the ad placement is less than $0.25 (e.g., without user

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input specifying acceptance of those specific offers). In another use case, when the price of the ad placement is less than $0.50, an intermediary platform associated with a pizza restaurant may automatically accepts offers of ad placements with reminders regarding lunch or dinner that will potentially be presented to a user on a mobile phone (e.g., without user input specifying acceptance of those specific offers).

[028] Other uses of system 100 are described herein and still others will be apparent to those having skill in the art. Having described a high level overview of some of the system functions, attention will now be turned to various system components that facilitate these and other functions.

[029] System Components

[030] System 100 may include a computer system 104, one or more content providers 160, one or more user devices 170, one or more advertisers 180, an advertising intermediary platform 190 and/or other components. Computer system 104 may interface with content provider(s) 160 to allow users to access content offered by content provider(s) 160, one or more advertisers and/or an advertising intermediary 190 to provide advertisements for presentation to users, and various interfaces of the user device(s) 170 such that users may interact with computer system 104.

[031] To facilitate these and other functions, computer system 104 may include one or more computing devices 110. Each computing device 110 may include one or more processors 112, one or more storage devices 114, and/or other components.

[032] Processor(s) 112 may be programmed by one or more computer program instructions, which may be stored in storage device(s) 114. The one or more computer program instructions may include, without limitation, a user request marketing application 120 and a reminder marketing application 140. User request marketing application 120 and/or reminder marketing application 140 may themselves include different sets of instructions that each program the processor(s) 112 (and therefore computer system 104) to perform one or more operations described herein. For example, user request marketing application 120 may include user request marketing management instructions 122, user request packaging instructions 124, user request recommendation instructions 126, user request reporting instructions 128, and/or other instructions 130 that program computer system 104. Reminder marketing application 140 may include reminder marketing management application 142, dynamic

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pricing instructions 144, time-based pricing instructions 146, reminder packaging instructions 148, reminder recommendation instructions 150, reminder reporting instructions 152, and/or other instructions 130 that program computer system 104. Other applications may, of course, include one or more of the instructions 118-152 to perform one or more operations as described herein.

[033] In some implementations, a given user device 170 may comprise a given computer device 110. As such, the given user device 170 may comprise processor(s) 112 that are programmed with one or more computer program instructions, such as user input processing instructions 118, user request marketing management instructions 122, user request packaging instructions 124, user request recommendation instructions 126, user request reporting instructions 128, reminder marketing management application 142, dynamic pricing instructions 144, time-based pricing instructions 146, reminder packaging instructions 148, reminder recommendation instructions 150, reminder reporting instructions 152, or other instructions 130.

[034] In one implementation, one or more advertisers 180 may establish relationships with an intermediary platform 190 to allocate advertisements to the ad placements associated with the user requests and/or reminders. Intermediary platform 190 may serve as an intermediary between advertisers wishing to purchase ad placements and publishers wishing to find advertisers for unused/unsold advertising opportunities. Intermediary platform 190 may store advertisements and information provided by advertisers 180. For example, advertisements may be uploaded from advertisers to the intermediary platform 190 for display in the user request and/or reminders for which ad placements have been purchased. In an implementation, intermediary platform 190 may receive, negotiate, or accept advertisement opportunities offered by system 100 to the one or more advertisers 180. In an implementation, the one or more advertisers 180 and the intermediary platform 190 may have pre-negotiated agreements which enable the intermediary platform 190 to accept and provide advertisements to system 100 on behalf of the advertisers 180. For example, intermediary platform 190 may accept offers or submits bids on behalf of the advertisers 180 based on pre-negotiated agreements for purchasing ad placements associated with user requests and/or reminders.

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[035] As used hereinafter, for convenience, the foregoing instructions will be described as performing an operation, when, in fact, the various instructions may program processor(s) 112 (and thereafter computer system 104) to perform the operation. It should be appreciated that the various instructions are described individually as discreet sets of instructions by way of illustration and not limitation, as two or more of the instructions may be combined.

[036] User Input Processing

[037] In an implementation, user input processing instructions 118 may process one or more user inputs of a user to determine one or more user requests that are intended by the user when the user provided the user inputs (e.g., creation of a reminder or other user request). The user inputs may comprise an auditory input (e.g., received via a microphone), a visual input (e.g., received via a camera), a tactile input (e.g., received via a touch sensor device), an olfactory input, a gustatory input, a keyboard input, a mouse input, or other user input. As described herein elsewhere, user input processing instructions 118 may comprise instructions associated with one or more speech recognition engines (e.g., speech recognition engine(s) 220 of FIG. 2), one or more natural language processing engines (e.g., natural language processing engine(s) 230 of FIG. 2), or other components for processing user inputs to determine user requests related to the user inputs.

[038] In one use case, if the user input is a natural language utterance spoken by a user, the natural language utterance may be processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine a type of user request or reminder including one or more of a category associated with the user request or the reminder, a location at which the user request is made or with which the reminder is associated, a time at which the user request is made or with which the reminder is associated, a device type of a device at which the user request or the reminder was made, a device type of a device at which a response to the user request or the reminder will potentially be presented to the user, or other parameter.

[039] FIG. 2 illustrates a system 200 for facilitating natural language processing, according to an implementation of the invention. As shown in FIG. 2, system 200 may comprise input device(s) 210, speech recognition engine(s) 220, natural language processing engine(s) 230, application(s) 240, output device(s) 250, database(s) 132, or other components.

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[040] In an implementation, one or more components of system 200 may comprise one or more computer program instructions of FIG. 1 and/or processor(s) 112 programmed with the computer program instructions of FIG. 1. As an example, speech recognition engine(s) 220 and/or natural language processing engine(s) 230 may comprise user input processing instructions 118 or other instructions 130 (e.g., grammar management instructions, profile management instructions, or other instructions).

[041] Input device(s) 210 may comprise an auditory input device (e.g., microphone), a visual input device (e.g., camera), a tactile input device (e.g., touch sensor), an olfactory input device, a gustatory input device, a keyboard, a mouse, or other input devices. Input received at input device(s) 210 may be provided to speech recognition engine(s) 220 and/or natural language processing engine(s) 230.

[042] Speech recognition engine(s) 220 may process one or more inputs received from input device(s) 210 to recognize one or more words represented by the received inputs. As an example, with respect to auditory input, speech recognition engine(s) 220 may process an audio stream captured by an auditory input device to isolate segments of sound of the audio stream. The sound segments (or a representation of the sound segments) are then processed with one or more speech models (e.g., acoustic model, lexicon list, language model, etc.) to recognize one or more words of the received inputs. Upon recognition of the words of received inputs, the recognized words may then be provided to natural language processing engine(s) 230 for further processing. In other examples, natural language processing engine(s) 230 may process one or more other types of inputs (e.g., visual input representing sign language communication, gestures, or other forms of communication) to recognize one or more words represented by the other types of inputs.

[043] Natural language processing engine(s) 230 may receive one or more inputs from input device(s) 210, speech recognition engine(s) 220, application(s) 240, database(s) 132, or other components. As an example, natural language processing engine(s) 230 may process inputs received from input device(s) 210, such as user inputs (e.g., voice, non-voice, etc.), location-based inputs (e.g., GPS data, cell ID, etc.), other sensor data input, or other inputs to determine context information associated with one or more user inputs. As another example, natural language processing engine(s) 230 may obtain grammar information, profile information, context information, or other information from database(s) 132. The obtained

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information (or context information determined based on inputs from input device(s) 210) may be processed to determine one or more user requests associated with one or more user inputs of a user. In yet another example, natural language processing engine(s) 230 may process one or more recognized words from speech recognition engine(s) 220 and other information (e.g., information from input device(s) 210, application(s) 240, and/or database(s) 132) to determine one or more user requests associated with one or more user inputs of a user.

[044] In an implementation, natural language processing engine(s) 230 may solicit further inputs from a user by responding with a request for more information via output device(s) 250 if, for instance, a user request associated with a user input of a user cannot be determined with sufficient confidence, more information would helpful to process the user request, etc.

[045] In an implementation, upon determination of a user request of a user, natural language processing engine(s) 230 may determine an application 240 suitable for executing the user request, and provide the user request to the application for further processing. In one scenario, the application 240 may provide one or more results of the user request to output device(s) 250 for presentation to the user.

[046] In another scenario, the application 240 may provide the results of the user request to natural language processing engine(s) 230 for further processing. As an example, the results of the user request may comprise intermediate results that are provided as a parameter for another user request of the user that is to be executed at another application 240. As such, the natural language processing engine(s) 230 may generate the other user request based on the intermediate results, and provide the other user request to the other application 240. As another example, natural language processing engine(s) 230 may formulate a natural language response based on the results received from the application 240, and provide the natural language response to output device(s) 250 for presentation to the user.

[047] In an implementation, a given application 240 may obtain profile information, account information, or other information from database(s) 132 to authenticate a user before executing a user request of the user. As an example, the application 240 may be part of a given service provider. As such, the application 240 may determine whether the user has access to one or more services associated with the application 240 before executing the user request on behalf of the user.

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[048] In an implementation, a given application 240 may obtain content from database(s) 132 and/or content provider(s) 160 to provide one or more results of a user request of a user. In one use case, where the user request comprises a command to play a media item (e.g., song, video clip, movie, etc.), and the application 240 comprises a media stream application, the application 240 may obtain the media item from a given content provider(s) 160 and stream the media item to output device(s) 250 for presentation to the user.

[049] In an implementation, natural language processing engine(s) 230, application(s) 240, or other components may store information in database(s) 132 for later use by natural language processing engine(s) 230, application(s) 240, or other components. As an example, as described in further detail elsewhere herein, natural language processing engine(s) 230 may store information regarding user inputs in database(s) 132 and/or update profile information, grammar information, or other information in database(s) 132 based on the information regarding the user inputs.

[050] User Request Marketing Management

[051] In an implementation, user request marketing management instructions 122 may provide one or more advertisement opportunities related to user requests to one or more advertisers. As an example, a natural language utterance, a gesture (or other body movements), or other user input may be received from a user and processed to determine a user request related to the user input. Based on the user request, user request marketing management instructions 122 may provide one or more advertisement opportunity related to the user request to one or more advertisers.

[052] In an implementation, user request marketing management instructions 122 may provide an advertiser with an opportunity to purchase ad placement with real-time user requests. Specifically, an ad placement associated with a user request may be offered to one or more advertisers (e.g., via an intermediary platform) in real-time as the user request is being processed and before a response addressing the user request is provided to the user. For example, in response to receiving a user request, user request marketing management instructions 122 may provide an advertiser an opportunity to purchase an ad placement located within a response to the user request before the response addressing the user request is provided to the user. An advertiser may, for instance, purchase the ad placement by being the first advertiser to accept an offer for the ad placement, by submitting the highest bid for

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the ad placement, etc. The offer and/or purchase of the ad placement may be based on a category associated with the user request, a location at which the user request is made, a time at which the user request is made, a device type of a device at which the user request was made or at which a response to the user request will potentially be presented to a user, or other parameter.

[053] In an implementation, user request marketing management instructions 122 may provide an advertisement opportunity to advertisers based on parameters associated with the user request and parameters associated with the advertiser. For example, particular types of advertisement opportunities associated with user requests are presented to advertisers that seek to promote products or services related to the user requests. In one use case, user request marketing management instructions 122 may determine a category associated with the user request and provide an advertisement opportunity associated with the user request to only those advertisers that offer products or services related to the category associated with the user request. In another use case, the category associated with the user request may be utilized as at least one factor in determining which advertisers are to be provided with the associated advertisement opportunity.

[054] In an implementation, user request marketing management instructions 122 may enable an advertiser (via an intermediary platform) to allocate an advertisement to an ad placement associated with the user request. For example, after purchasing an ad placement associated with a user request, an advertiser may allocate an advertisement to the ad placement so that the advertisement will be provided along with (or as part of) a response addressing the user request for presentation to a user that initiated the user request. In one use case, the allocated advertisement may be presented to the user before or after a response to the user request (or a portion thereof that addresses the user request) is presented to the user (e.g., where both the advertisement and the portion addressing the user request are provided in an audio format). In another use case, the allocated advertisement and the portion addressing the user request may be simultaneously presented to the user (e.g., on a web page).

[055] User Request Marketing Packages

[056] In an implementation, user request packaging instructions 124 provide an advertiser with the opportunity to purchase one or more of a plurality of user request packages where

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each user request package may be associated with a certain number of ad placements with one or more types of user requests. For example, each type of user request may comprise one or more of a category associated with the user request, a location at which the user request is made, a time at which the user request is made, a device type of a device at which the user request was made or at which a response to the user request will potentially be presented to a user, or other parameter. User request packages may, for instance, be purchased using a store model, an auction model, or other model. In an implementation, user request packaging instructions 124 may provide the user request packages to advertisers based on parameters associated with the user request package and parameters associated with the advertiser. For example, particular types of user request packages are presented to advertisers that seek to promote related products or services.

[057] User Request Marketing Recommendations

[058] In an implementation, user request recommendation instructions 126 may provide recommendations of user request packages for an advertiser based on parameters associated with the user request packages and parameters associated with the advertiser. As an example, an owner of a pizza restaurant may indicate that the pizza restaurant is in need of customers from Sunday through Thursday and that the pizza restaurant does not deliver. As such, the owner may be recommended user request packages that comprise ad placements with user requests related to a search for food that will be submitted by users from Sunday through Thursday while the users are at locations within 3 miles from the pizza restaurant.

[059] User Request Marketing Reporting

[060] In an implementation, user request reporting instructions 128 may generate reports regarding user requests, and provide the reports to advertisers along with an opportunity to purchase recommended user request packages. For example, the reports may indicate the criteria used to determine the recommended user request packages for the advertisers (that are provided with the reports). In this way, advertisers will understand why certain user request packages are recommended for them, and may be enticed to purchase the recommended user request packages as a result.

[061] Reports may, for instance, indicate the number or frequency of user requests (e.g., with respect to request type) location of requests, time of requests, device types of devices at which requests were made or later presented to users, click-through rate, return of

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investment, or other performance measurement of ad placements with user requests with respect to request type, etc. In one use case, an owner of a pizza restaurant may be recommended user request packages that comprise user requests related to upcoming sport games that will be submitted by users within 3 miles from the pizza restaurant. In addition, a report indicating that users who queried online for information regarding upcoming sports games while the users were within 3 miles from the pizza restaurant frequently purchase pizzas from nearby restaurants within a few hours of their informational queries.

[062] Reminder Marketing Management

[063] In an implementation, reminder marketing management application 142 may provide one or more advertisement opportunities related to reminders to one or more advertisers. Reminders may, for example, relate to scheduled appointments, task deadlines, relevant dates/times, relevant user needs, or other items. Reminders may be created by users or automatically on behalf of users. As an example, a user may initiate creation of a reminder by submitting a user request specifying creating of the reminder. In another example, a reminder may be created on behalf of a user without a user request that specifies creation of the reminder. A need for a reminder may, for instance, be predicted for a user based on information about the user, such as the user's birthday, anniversary, appointments or other scheduled events, user requests submitted by the user (e.g., requests that do not necessarily specify creation of the reminder), or other information.

[064] In an implementation, reminder marketing management application 142 may provide advertisers with an opportunity to purchase an ad placement associated with a reminder upon creation of the reminder. As an example, in response to a reminder being created, and without further user input after creation of the reminder, reminder marketing management instructions 142 may provide one or more advertisers an opportunity to purchase an ad placement located within the reminder. An advertiser may, for instance, purchase the ad placement by being the first advertiser to accept an offer for the ad placement, by submitting the highest bid for the ad placement, etc. The offer and/or purchase of the ad placement may be based on a category associated with the reminder, a location associated with the reminder, a time associated with the reminder, a device type of a device at which a request for the reminder was made or at which the reminder will potentially be presented to a user, or other parameter.

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[065] In an implementation, reminder marketing management application 142 provides the advertisement opportunity to advertisers based on parameters associated with the reminder and parameters associated with the advertiser. For example, particular types of advertisement opportunities associated with reminders are presented to advertisers that seek to promote products or services related to the reminders. In one use case, reminder marketing management instructions 142 may determine a category associated with the reminder and provide an advertisement opportunity associated with the reminder to only those advertisers that offer products or services related to the category associated with the reminder. In another use case, the category associated with the reminder may be utilized as at least one factor in determining which advertisers are to be provided with the associated advertisement opportunity.

[066] In an implementation, reminder marketing management application 142 may enable an advertiser (via an intermediary platform) to allocate an advertisement to an ad placement associated with the reminder. For example, after purchasing the ad placement associated with a reminder, an advertiser may allocate an advertisement to the ad placement so that the advertisement will be provided along with (or as part of) the reminder for presentation to a user associated with the reminder.

[067] Dynamic Reminder Marketing

[068] In an implementation, dynamic pricing instructions 144 may dynamically change prices associated with ad placement on a reminder based on length of time from creation of the reminder, length of time from an end time associated with the reminder (e.g., expiration of the reminder), length of time from a predetermined time (e.g., at which presentation of the reminder to the associated user is triggered), a number of remaining scheduled presentations of the reminder to the user (e.g., the number of times the reminder is scheduled to be automatically presented to the user before an end time associated with the reminder), etc.

[069] In one use case, the price of placing an advertisement with a reminder may be decreased when there is only a certain amount of time left before expiration of the reminder (e.g., before the occurrence of the event associated with the reminder). As a result of the discounted price, the ad placement of the advertisement may remain (or become more) enticing for advertisers looking to purchase ad placements with reminders (e.g., even when their advertisement will only be placed with a reminder for a short period of time).

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[070] In another use case, the price of placing an advertisement with a reminder may be increased when there is only a certain amount of time left before expiration of the reminder. As an example, where advertisers are provided with the opportunity to purchase an ad placement with the reminder for immediate placement of their advertisement for a predetermined time period less than the remaining duration of the reminder, the last few days, hours, or other remaining time period associated with the reminder may be more valuable to advertisers than other time periods associated with the reminder.

[071] In yet another use case, the price of placing an advertisement with a reminder may change as the number of remaining scheduled "alerts" associated with the reminder change. As an example, the price may decrease (or increase) as the number of remaining alerts decrease. As another example, the price may increase (or decrease) as the number of remaining alerts increase (e.g., if the user associated with the reminder modifies the number of alerts of the reminder after creation of the reminder). In this way, the price of the ad placement may reflect the anticipated number of times that an advertisement of a purchasing advertiser will be presented to the user associated with the reminder.

[072] Time-Based Reminder Marketing

[073] In an implementation, time-based pricing instructions 146 may provide advertisers with the opportunity to purchase ad placement on reminders for a specified duration (e.g., a remaining time associated with the reminder, a predetermined time period less than the remaining time, etc.). An advertiser may, for instance, purchase an option to place advertisements for a few weeks, days, hours, etc., during which the reminder is still active. The available periods during which an advertisement can be placed with a reminder may comprise the beginning, the middle, the end, or other time period of the reminder.

[074] In an implementation, time-based pricing instructions may set prices such that prices associated with ad placement on a reminder during one time period of the reminder may be different than prices associated with ad placement on the reminder during another time period (e.g., the last few days, hours, etc., associated with the reminder may be more expensive to purchase than other time periods of the reminder).

[075] In an implementation, an ad placement with a reminder may end when the reminder is expired. For example, a reminder may expire when the event or user need related to the reminder is over. In an implementation, an advertisement may continue to be placed with a

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reminder even after the reminder's original expiration date if the expiration date of the reminder is extended. That is, the ad placement may dynamically be extended based on the extension of the reminder. As an example, an event associated with the reminder may be rescheduled for a later date, and the reminder (and its associated parameters) may be modified (e.g., automatically without user input specifying the modification to the reminder, manually by a user, etc.) to reflect the later date.

[076] Reminder Marketing Packages

[077] In an implementation, reminder packaging instructions 148 may provide an advertiser with the opportunity to purchase one or more of a plurality of reminder packages where each reminder package may be associated with a certain number of ad placements with one or more types of reminders. For example, each type of reminder may comprise one or more of a category associated with the reminder, a location associated with the reminder, a time associated with the reminder (e.g., date, time of day, etc.), a device type of a device at which a request for the reminder was made or at which the reminder will potentially be presented to a user, or other parameter. User request packages may, for instance, be purchased via a store model, an auction model, or other model.

[078] In an implementation, reminder packaging instructions 148 may provide the reminder packages to advertisers based on parameters associated with the reminder package and parameters associated with the advertiser. For example, particular types of reminder packages are presented to advertisers that seek to promote related products or services.

[079] Reminder Marketing Recommendations

[080] In an implementation, reminder recommendation instructions 150 may provide recommendations of reminder packages for an advertiser based on parameters associated with the reminder packages and parameters associated with the advertiser. As an example, a tire retailer may be recommended reminder packages that comprise ad placements with reminders related to tire purchases based on a determination that the tire retailer sells tires (e.g., a reminder to replace tires when the associated user's tires reaches their treadlife). As another example, the reminder packages may be recommended for the tire retailer further based on a location of the tire retailer. In particular, for instance, the reminder packages may comprise ad placements with tired-purchase-related reminders associated with users that reside within a proximity threshold distance from the location of the tire retailer.

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[081] Reminder Marketing Reporting

[082] In an implementation, reminder reporting instructions 152 may generate reports regarding reminders, and provide the reports to advertisers along with an opportunity to purchase recommended reminder packages. For example, the reports may indicate the criteria used to determine the recommended reminder packages for the advertisers (that are provided with the reports). In this way, advertisements will understand why certain reminder packages are recommended for them, and may be enticed to purchase the recommended reminder packages as a result.

[083] Reports may, for instance, indicate the number or frequency of reminders (e.g., with respect to reminder type, location, time, device types, or other parameters), location associated with the reminders, time associated with the reminders, device types of devices at which reminders were made or later presented to users, click-through rate, return of investment, or other performance measurement of ad placements with user requests with respect to request type, etc. In one use case, a tire retailer may be provided with a report that indicate the click-through rate and/or the return of investment of tire-related advertisements placed with tire-related reminders of users that reside near the tire retailer (e.g., within a proximity threshold distance). In addition, along with the report, the tire retailer may be recommended reminder packages that comprise ad placements with tire-purchase-related reminders of users that reside near the tire retailer.

[084] Examples of System Architectures and Configurations

[085] Different system architectures may be used. For example, all or a portion of user request marketing application 120 and reminder marketing application 140 may be executed on a user device. In other words, computing device 110 as illustrated may include a user device operated by the user. In implementations where all or a portion of user request marketing application 120 and reminder marketing application 140 are executed on the user device, market user requests and reminders, and/or perform other functions/operations of user request marketing application 120 and reminder marketing application 140.

[086] All or a portion of user request marketing application 120 and reminder marketing application 140 may be executed on a server device. In other words, computing device 110 as illustrated may include a server device that obtains a user request from a user device operated by the user. In implementations where all or a portion of user request marketing application

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120 and reminder marketing application 140 are executed on the server device, market user requests and reminders, and/or perform other functions/operations of user request marketing application 120 and reminder marketing application 140.

[087] Although illustrated in FIG. 1 as a single component, computer system 104 may include a plurality of individual components (e.g., computer devices) each programmed with at least some of the functions described herein. In this manner, some components of computer system 104 may perform some functions while other components may perform other functions, as would be appreciated. The one or more processors 112 may each include one or more physical processors that are programmed by computer program instructions. The various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as the processor(s) 112 are programmed to perform the functions described herein.

[088] It should be appreciated that although the various instructions are illustrated in FIG. 1 as being co-located within a single computing device 110, one or more instructions may be executed remotely from the other instructions. For example, some computing devices 110 of computer system 104 may be programmed by some instructions while other computing devices 110 may be programmed by other instructions, as would be appreciated. Furthermore, the various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as processor(s) 112 are programmed to perform the functions described herein.

[089] The description of the functionality provided by the different instructions described herein is for illustrative purposes, and is not intended to be limiting, as any of instructions may provide more or less functionality than is described. For example, one or more of the instructions may be eliminated, and some or all of its functionality may be provided by other ones of the instructions. As another example, processor(s) 112 may be programmed by one or more additional instructions that may perform some or all of the functionality attributed herein to one of the instructions.

[090] The various instructions described herein may be stored in a storage device 114, which may comprise random access memory (RAM), read only memory (ROM), and/or other memory. The storage device may store the computer program instructions (e.g., the aforementioned instructions) to be executed by processor(s) 112 as well as data that may be

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manipulated by processor(s) 112. The storage device may comprise floppy disks, hard disks, optical disks, tapes, or other storage media for storing computer-executable instructions and/or data.

[091] The various components illustrated in FIG. 1 may be coupled to at least one other component via a network 102, which may include any one or more of, for instance, the Internet, an intranet, a PAN (Personal Area Network), a LAN (Local Area Network), a WAN (Wide Area Network), a SAN (Storage Area Network), a MAN (Metropolitan Area Network), a wireless network, a cellular communications network, a Public Switched Telephone Network, and/or other network. In FIG. 1 and other drawing Figures, different numbers of entities than depicted may be used. Furthermore, according to various implementations, the components described herein may be implemented in hardware and/or software that configure hardware.

[092] User device(s) may include a device that can interact with computer system 104 through network 102. Such user device(s) may include, without limitation, a tablet computing device, a smartphone, a laptop computing device, a desktop computing device, a network-enabled appliance such as a "Smart" television, a vehicle computing device, and/or other device that may interact with computer system 104.

[093] The various databases 132 described herein may be, include, or interface to, for example, an Oracle™ relational database sold commercially by Oracle Corporation. Other databases, such as Informix™, DB2 (Database 2) or other data storage, including file-based (e.g., comma or tab separated files), or query formats, platforms, or resources such as OLAP (On Line Analytical Processing), SQL (Structured Query Language), a SAN (storage area network), Microsoft Access™, MySQL, PostgreSQL, HSpace, Apache Cassandra, MongoDB, Apache CouchDB™, or others may also be used, incorporated, or accessed. The database may comprise one or more such databases that reside in one or more physical devices and in one or more physical locations. The database may store a plurality of types of data and/or files and associated data or file descriptions, administrative information, or any other data. The database(s) 132 may be stored in storage device 114 and/or other storage that is accessible to computer system 104.

[094] Example Flow Diagrams

[095] The following flow diagrams describe operations that may be accomplished using some or all of the system components described in detail above and, in some implementations,

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various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[096] FIG. 3 illustrates a data flow for a process of marketing user requests, according to an implementation of the invention. The various processing data flows depicted in FIG. 3 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[097] In an implementation, a user request generated by a user device 170 may be provided to a computer system 104. In response to receiving the user request, the computer system 104 may provide an advertisement opportunity to an intermediary platform 190 and/or one or more advertisers 180. In response to purchasing the advertising opportunity (e.g., by an advertiser 180, by the intermediary platform 190 on behalf of the advertiser 180, etc.), the intermediary platform 190 and/or a purchasing advertiser 180 may provide an advertisement to the computer system 104. If the intermediary platform 190 and/or the advertisers 180 choose not to purchase the advertisement opportunity, the computer system 104 may not receive an advertisement from them. In response to receiving an advertisement from the intermediary platform 190 and/or the purchasing advertiser 180, the computer system 104 may provide a response to the user request with the advertisement to the user device 170.

[098] FIG. 4 illustrates a data flow for a process of marketing reminders, according to an implementation of the invention. The various processing data flows depicted in FIG. 4 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with

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some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[099] In an implementation, a reminder created by a user device 170 (or a request to create the reminder) may be provided to a computer system 104. In response to receiving the reminder (or the create request), the computer system 104 may provide an advertisement opportunity to an intermediary platform 190 and/or one or more advertisers 180. In response to purchasing the advertising opportunity (e.g., by an advertiser 180, by the intermediary platform 190 on behalf of the advertiser 180, etc.), the intermediary platform 190 and/or a purchasing advertiser 180 may provide an advertisement to the computer system 104. If the intermediary platform 190 and/or the advertisers 180 choose not to purchase the advertisement opportunity, the computer system 104 may not receive an advertisement from them. In response to receiving an advertisement from the intermediary platform 190 and/or the purchasing advertiser 180, the computer system 104 may provide the advertisement with the reminder for presentation to the user.

[0100] FIG. 5 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with user requests, according to an implementation of the invention. The various processing data flows depicted in FIG. 5 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[0101] In an operation 502, a natural language utterance of a user may be processed to determine a user request related to the natural language utterance. As an example, a user input comprising the natural language utterance may be received and processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the

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user, by a natural language processing engine to determine the user request related to the natural language utterance.

[0102] In an operation 504, a category associated with the natural language utterance may be determined based on one or more words of the utterance, context information associated with the utterance, or other information. As a result of this determination, for instance, the user request (determined based on the natural language utterance) may be identified as being related to the category associated with the natural language utterance.

[0103] In an operation 506, an advertisement opportunity associated with the user request may be provided to one or more advertisers based on the category associated with the natural language utterance. For example, the advertisement opportunity may provide an advertiser an opportunity to purchase an ad placement associated with the user request with which the advertiser can place advertisements (or other content) to promote their products or services. The opportunity may, for instance, be provided to advertisers that have indicated an interest in purchasing ad placements associated with user requests related to the determined category. In one implementation, the advertisement opportunity may be provided to an advertiser in real-time as the user request is being processed and before a response addressing the user request is provided for presentation to the user.

[0104] In an operation 508, a determination that a first advertiser purchased an ad placement associated with the user request (responsive to the advertisement opportunity) may be effectuated. As an example, an advertiser may purchase an ad placement associated with the user request by accepting an active offer for the ad placement, by submitting the highest bid for the ad placement during an auction for the ad placement, etc. In some implementations, purchasing of an ad placement by an advertiser may comprise an intermediary (e.g., intermediary platform 190) accepting an active offer for the ad placement or submitting the highest bid on behalf of the advertiser (e.g., based on a pre-negotiated agreement between the intermediary and the advertiser).

[0105] In an operation 510, an ad placement associated with the user request may be allocated for an advertisement associated with the first advertiser. The allocation may, for instance, be based on the determination that the first advertiser purchased an ad placement associated with the user request.

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[0106] In an operation 512, a response to the user request that comprises a first advertisement associated with the first advertiser may be provided for presentation to the user based on the allocation.

[0107] FIG. 6 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with reminders, according to an implementation of the invention. The various processing data flows depicted in FIG. 6 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[0108] In an operation 602, a reminder associated with a user may be identified. As an example, the identified reminder may have been created by the user or automatically created on behalf of the user without a user request to create the reminder. In one use case, with respect to user creation of a reminder, a user may initiate the creation of a reminder via speech, for instance, by providing a natural language utterance related to the reminder that the user desires to be created. The natural language utterance may be received and processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to create the reminder.

[0109] In an operation 604, an advertisement opportunity associated with the reminder may be provided to one or more advertisers. For example, the advertisement opportunity may provide an advertiser an opportunity to purchase an ad placement associated with the reminder with which the advertiser can place advertisements to promote their products or services. In one implementation, the price of an ad placement associated with the reminder may dynamically change based on a length of time from creation of the reminder, length of time from an end time associated with the reminder (e.g., expiration of the reminder), length of time from a predetermined time (e.g., at which presentation of the reminder to the associated user is trigger), a number of remaining scheduled presentations of the reminder to

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the user (e.g., the number of times the reminder is scheduled to be automatically presented to the user before an end time associated with the reminder), etc. In another implementation, the advertisement opportunity may comprise an opportunity to purchase an ad placement that allows for placement of an advertisement for a predetermined duration (e.g., less than a remaining time associated with the reminder, equal to the remaining time, etc.).

[0110] In an operation 606, a determination that a first advertiser purchased an ad placement associated with the reminder (responsive to the advertisement opportunity) may be effectuated. As an example, an advertiser may purchase an ad placement associated with the reminder by accepting an active offer for the ad placement, by submitting the highest bid for the ad placement during an auction for the ad placement, etc. In some implementations, purchasing of an ad placement by an advertiser may comprise an intermediary (e.g., intermediary platform 190) accepting an active offer for the ad placement or submitting the highest bid on behalf of the advertiser (e.g., based on a pre-negotiated agreement between the intermediary and the advertiser).

[0111] In an operation 608, an ad placement associated with the reminder may be allocated for an advertisement associated with the first advertiser. The allocation may, for instance, be based on the determination that the first advertiser purchased an ad placement associated with the reminder.

[0112] In an operation 610, an indication to provide the reminder for presentation to the user may be received. As an example, the indication may be based on a user request to view the reminder. As another example, the indication may be based on a time-based trigger (e.g., triggering on a periodic basis, at one or more predetermined times, etc.), a location-based trigger (e.g., triggering when the user is within proximity of one or more predetermined locations), a keyword-based trigger (e.g., triggering when one or more predetermined keywords are detected), or other trigger.

[0113] In an operation 612, a first advertisement associated with the first advertiser may be provided for presentation to the user with the reminder based on the received indication (to provide the reminder for presentation to the user) and the allocation.

[0114] Example Screenshots

[0115] FIG. 7 illustrates a screenshot 700 of a user interface which provides an advertisement associated with an advertiser that purchased an ad placement associated with a user request,

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according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. With respect to screenshot 700, a user may provide a natural language input (e.g., natural language utterance or other input) indicating a user request to search for restaurants from which the user can order pizza. In response to the natural language input, an application associated with the depicted user interface may provide an advertisement opportunity related to the user request to one or more advertisers. As an example, the advertisement opportunity may enable advertisers to purchase an ad placement associated with the user request that allows a purchasing advertiser to place advertisements to market their products or services. If the advertisement opportunity is purchased by an advertiser, an advertisement associated with the advertiser may be provided in a response to the user request for presentation to the user. As depicted in screenshot 700, the response to the user request may include results for pizza restaurants nearby and an advertisement of a pizza deal for one of the nearby restaurants (e.g., Mama's Pizza). The advertisement may, for instance, be associated with a restaurant for which an intermediary purchased an ad placement associated with the user request.

[0116] FIG. 8 illustrates a screenshot 800 of a user interface which provides an advertisement which provides an advertisement associated with an advertiser that purchased an ad placement associated with reminder, according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. With respect to screenshot 800, a user may create a reminder to remind the user of an anniversary (e.g., wedding anniversary). In response to receiving a reminder request from the user, an application associated with the depicted user interface may provide an advertisement opportunity related to the reminder to one or more advertisers. As an example, the advertisement opportunity may enable advertisers to purchase an ad placement associated with the reminder that allows a purchasing advertiser to place advertisements to market their products or services. If the advertisement opportunity is purchased by an advertiser, an advertisement associated with the advertiser is provided in (or with) the reminder (e.g., for at least a predetermined number of times, a predetermined duration, etc.). As depicted in screenshot 800, the reminder may include a message about the user's upcoming anniversary and an advertisement providing a deal on flowers. The

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advertisement may, for instance, be associated with a business for which an intermediary purchased an ad placement associated with the reminder.

[0117] Other implementations, uses and advantages of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. The specification should be considered exemplary only, and the scope of the invention is accordingly intended to be limited only by the following claims.

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What is claimed is:

1. A method for facilitating purchase of ad placements associated with reminders, the method being implemented on a computer system having one or more physical processors programmed with computer program instructions which, when executed, perform the method, the method comprising:

identifying, by the computer system, one or more reminders associated with a user, wherein the one or more reminders comprise a first reminder for the user;

providing, by the computer system, an advertisement opportunity associated with the first reminder to one or more advertisers, wherein the advertisement opportunity comprises an opportunity to purchase an ad placement associated with the first reminder, and wherein the one or more advertisers comprise a first advertiser;

determining, by the computer system, that the first advertiser purchased an ad placement associated with the first reminder;

allocating, by the computer system, an ad placement associated with the first reminder for an advertisement associated with the first advertiser based on the determination that the first advertiser purchased an ad placement with the first reminder;

receiving, at the computer system, an indication to provide the first reminder for presentation to the user; and

providing, by the computer system, a first advertisement associated with the first advertiser with the first reminder for presentation to the user based on the received indication and the allocation.

2. The method of claim 1, wherein providing the advertisement opportunity comprises providing, without further user input after creation of the first reminder, the advertisement opportunity to the one or more advertisers.

3. The method of claim 2, wherein allocating an ad placement associated with the first reminder for an advertisement associated with the first advertiser comprises allocating, without further user input after the creation of the first reminder, an ad placement associated with the first reminder for an advertisement associated with the first advertiser.

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4. The method of claim 2, wherein the first reminder is created based on a user request that specifies creating the first reminder.

5. The method of claim 2, wherein the first reminder is created without a user request that specifies creating the first reminder.

6. The method of claim 2, further comprising:

receiving, at the computer system, a natural language utterance;

performing, by the computer system, speech recognition on the natural language utterance to recognize one or more words associated with the natural language utterance; and

creating, by the computer system, the first reminder for the user based on the one or more recognized words.

7. The method of claim 6, further comprising:

determining, by the computer system, context information associated with the natural language utterance,

wherein creating the first reminder comprises creating the first reminder based on the one or more recognized words and the context information.

8. The method of claim 1, wherein providing the advertisement opportunity comprises providing the advertisement opportunity to the one or more advertisers based on one or more of a category associated with words of the reminder, a location associated with the reminder, a time associated with the reminder, or a device type of a device at which the reminder will potentially be presented to the user.

9. The method of claim 1, wherein determining that the first advertiser purchased an ad placement associated with the first reminder comprises determining that the first advertiser purchased an ad placement associated with the first reminder based on the first advertiser accepting a price associated with the advertisement opportunity.

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10. The method of claim 1, wherein determining that the first advertiser purchased an ad placement associated with the first reminder comprises determining that the first advertiser purchased an ad placement associated with the first reminder based on the first advertiser placing a highest bid during an auction for an ad placement associated with the first reminder.

11. The method of claim 1, wherein providing the advertisement opportunity comprises providing, to the one or more advertisers, an opportunity to purchase an ad placement associated with the first reminder in exchange for a price that is based on at least one of a length of time from the creation of the first reminder or a length of time from an end time associated with the reminder.

12. The method of claim 1, wherein providing the advertisement opportunity comprises providing, to the one or more advertisers, an opportunity to purchase an ad placement associated with the first reminder in exchange for a price that is based on a number of remaining scheduled presentations of the first reminder to the user.

13. The method of claim 1, wherein providing the advertisement opportunity comprises providing, to the one or more advertisers, an opportunity to purchase an ad placement that allows for placement of an advertisement for a predetermined duration less than a remaining time associated with the first reminder.

14. A system for facilitating purchase of ad placements associated with reminders, the system comprising:

one or more physical processors programmed with compute r program instructions which, when executed, cause the one or more physical processors to:

identify one or more reminders associated with a user, wherein the one or more reminders comprise a first reminder for the user;

provide an advertisement opportunity associated with the first reminder to one or more advertisers, wherein the advertisement opportunity comprises an opportunity to purchase an ad placement associated with the first reminder, and wherein the one

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or more advertisers comprise the first advertiser;

determine that the first advertiser purchased an ad placement associated with the first reminder;

allocate an ad placement associated with the first reminder for an advertisement associated with the first advertiser based on the determination that the first advertiser purchased an ad placement associated with the first reminder;

receive an indication to provide the first reminder for presentation to the user; and

provide a first advertisement associated with the first advertiser with the first reminder for presentation to the user based on the received indication and the allocation.

15. The system of claim 14, wherein providing the advertisement opportunity comprises providing, without further user input after creation of the first reminder, the advertisement opportunity to the one or more advertisers.

16. The system of claim 15, wherein allocating an ad placement associated with the first reminder for an advertisement associated with the first advertiser comprises allocating, without further user input after the creation of the first reminder, an ad placement associated with the first reminder for an advertisement associated with the first advertiser.

17. The system of claim 15, wherein the one or more physical processors are further caused to:

receive a natural language utterance;

perform speech recognition on the natural language utterance to recognize one or more words associated with the natural language utterance; and

create the first reminder for the user based on the one or more recognized words.

18. The system of claim 17, wherein the one or more physical processors are further caused to:

determine context information associated with the natural language utterance,

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wherein creating the first reminder comprises creating the first reminder based on the one or more recognized words and the context information.

19. The system of claim 14, wherein providing the advertisement opportunity comprises providing, to the one or more advertisers, an opportunity to purchase an ad placement associated with the first reminder in exchange for a price that is based on at least one of a length of time from the creation of the first reminder or a length of time from an end time associated with the reminder.

20. The system of claim 14, wherein providing the advertisement opportunity comprises providing, to the one or more advertisers, an opportunity to purchase an ad placement associated with the first reminder in exchange for a price that is based on a number of remaining scheduled presentations of the first reminder to the user.

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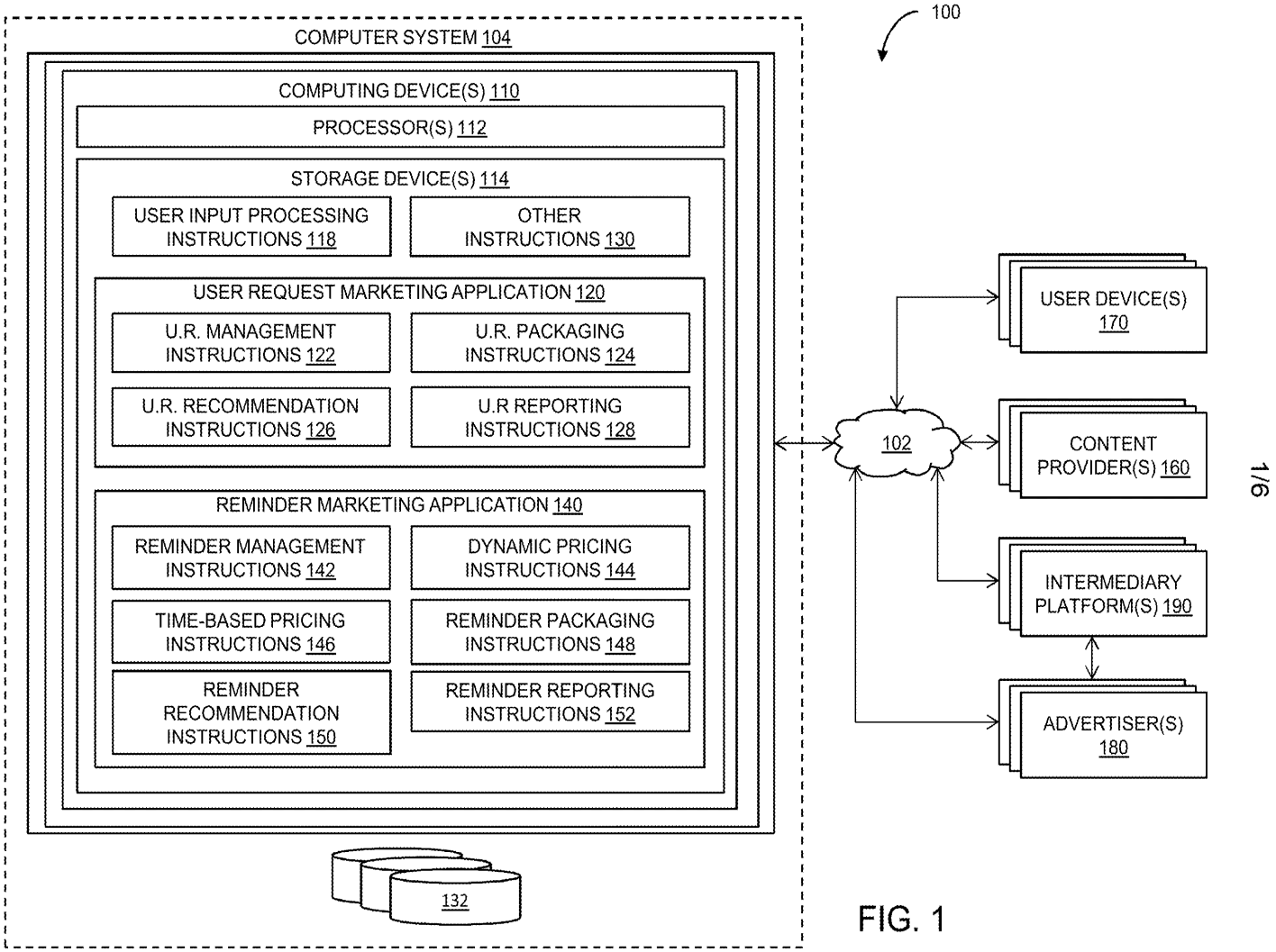

100
COMPUTER SYSTEM 104
COMPUTING DEVICE(S) 110
PROCESSOR(S) 112
STORAGE DEVICE(S) 114
USER INPUT PROCESSING INSTRUCTIONS 118
OTHER INSTRUCTIONS 130
USER REQUEST MARKETING APPLICATION 120
U.R. MANAGEMENT INSTRUCTIONS 122
U.R. PACKAGING INSTRUCTIONS 124
U.R. RECOMMENDATION INSTRUCTIONS 126
U.R REPORTING INSTRUCTIONS 128
REMINDER MARKETING APPLICATION 140
REMINDER MANAGEMENT INSTRUCTIONS 142
DYNAMIC PRICING INSTRUCTIONS 144
TIME-BASED PRICING INSTRUCTIONS 146
REMINDER PACKAGING INSTRUCTIONS 148
REMINDER RECOMMENDATION INSTRUCTIONS 150
REMINDER REPORTING INSTRUCTIONS 152
132
102
USER DEVICE(S) 170
CONTENT PROVIDER(S) 160
INTERMEDIARY PLATFORM(S) 190
ADVERTISER(S) 180

FIG. 1

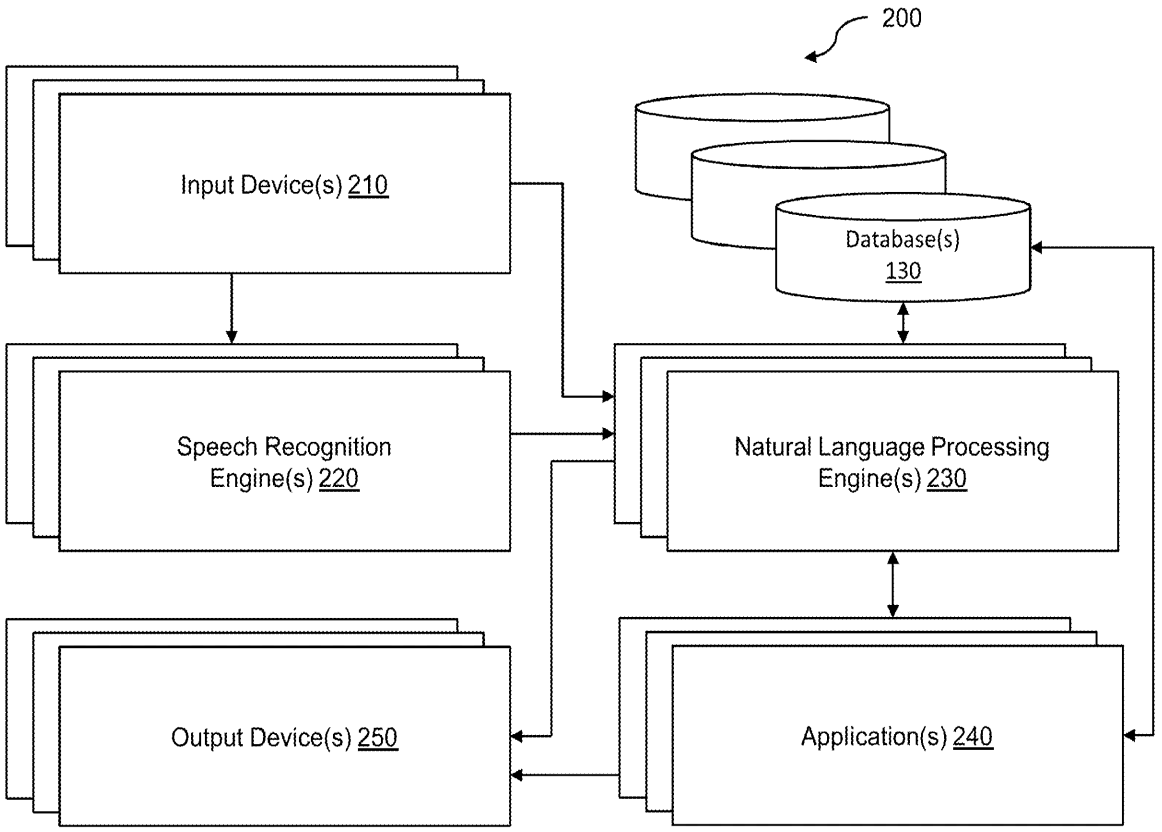

200
Input Device(s) 210
Database(s) 130
Speech Recognition Engine(s) 220
Natural Language Processing Engine(s) 230
Output Device(s) 250
Application(s) 240

FIG. 2

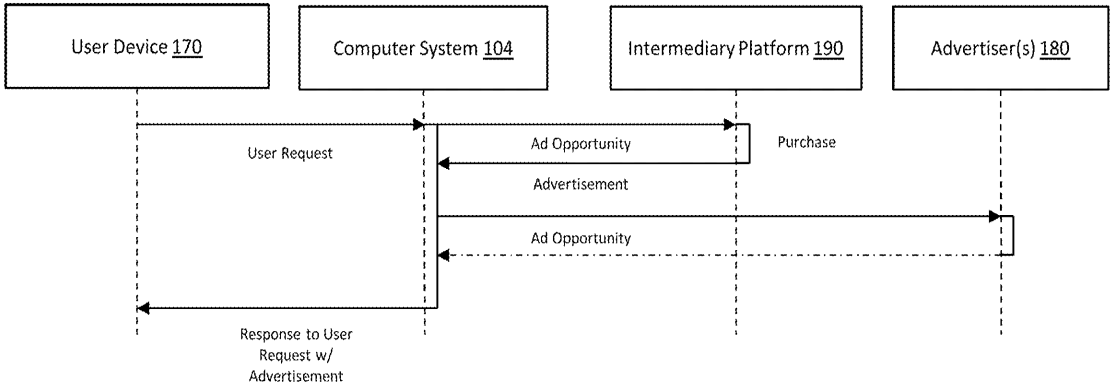

User Device 170
Computer System 104
Intermediary Platform 190
Advertiser(s) 180
User Request
Ad Opportunity
Purchase
Advertisement
Ad Opportunity
Response to User Request w/ Advertisement

FIG. 3

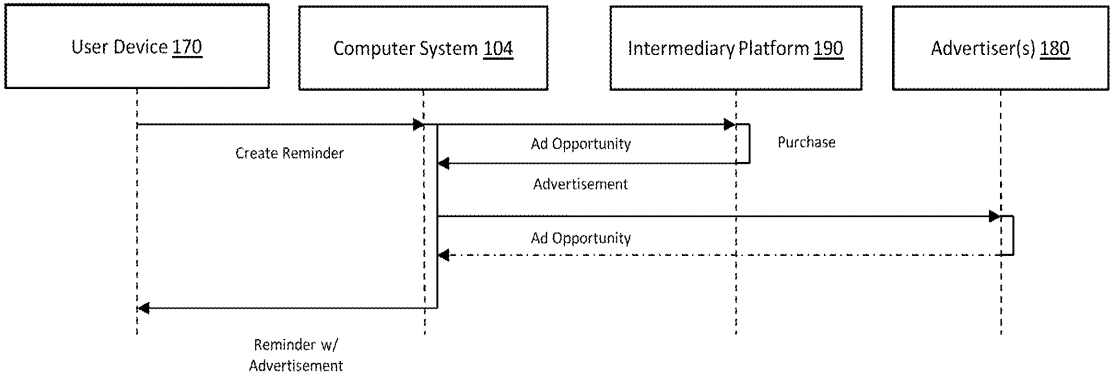

User Device 170
Computer System 104
Intermediary Platform 190
Advertiser(s) 180
Create Reminder
Ad Opportunity
Purchase
Advertisement
Ad Opportunity
Reminder w/ Advertisement

FIG. 4

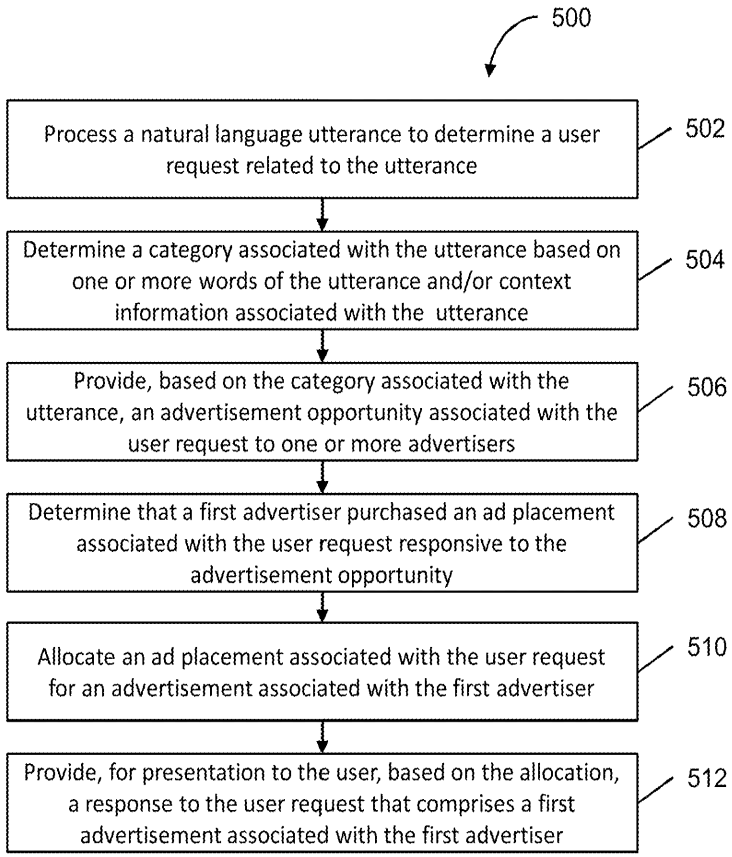

500
Process a natural language utterance to determine a user request related to the utterance
502
Determine a category associated with the utterance based on one or more words of the utterance and/or context information associated with the utterance
504
Provide, based on the category associated with the utterance, an advertisement opportunity associated with the user request to one or more advertisers
506
Determine that a first advertiser purchased an ad placement associated with the user request responsive to the advertisement opportunity
508
Allocate an ad placement associated with the user request for an advertisement associated with the first advertiser
510
Provide, for presentation to the user, based on the allocation, a response to the user request that comprises a first advertisement associated with the first advertiser
512

FIG. 5

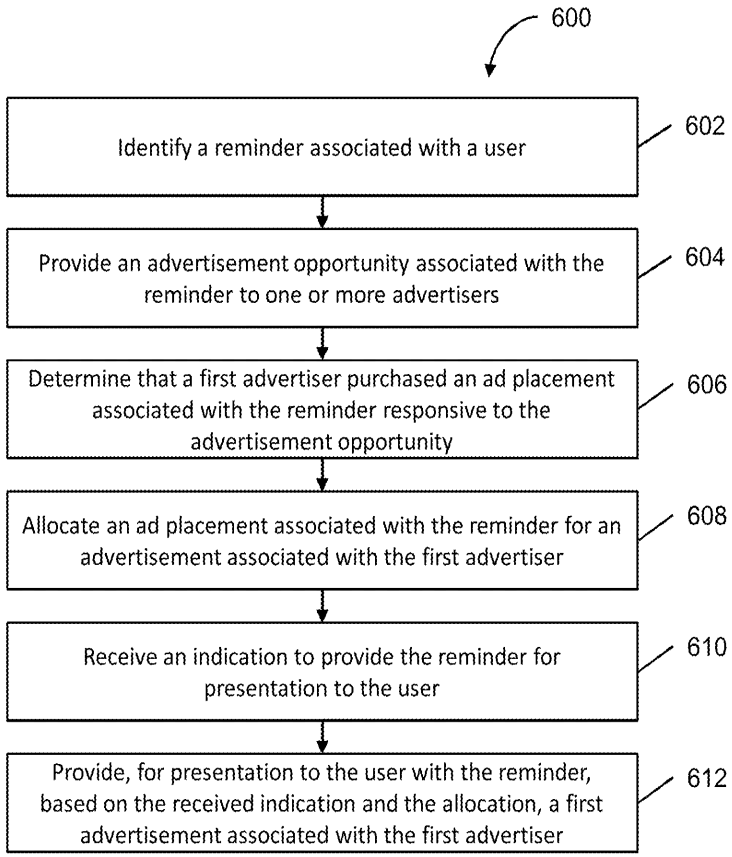

600
Identify a reminder associated with a user
602
Provide an advertisement opportunity associated with the reminder to one or more advertisers
604
Determine that a first advertiser purchased an ad placement associated with the reminder responsive to the advertisement opportunity
606
Allocate an ad placement associated with the reminder for an advertisement associated with the first advertiser
608
Receive an indication to provide the reminder for presentation to the user
610
Provide, for presentation to the user with the reminder, based on the received indication and the allocation, a first advertisement associated with the first advertiser
612

FIG. 6

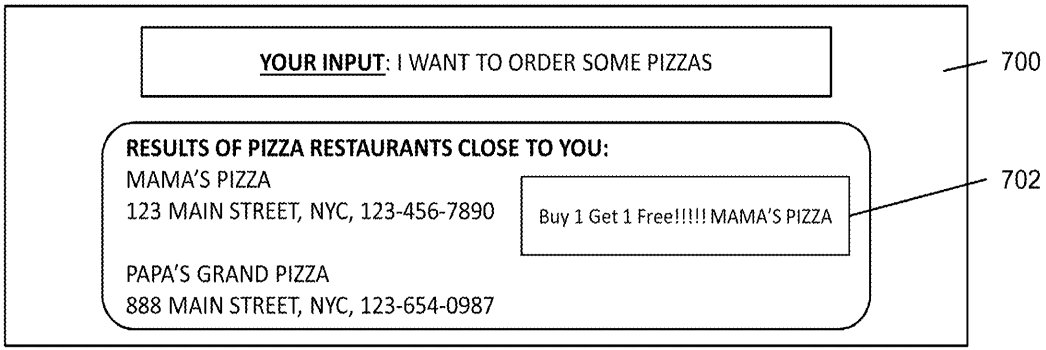


FIG. 7

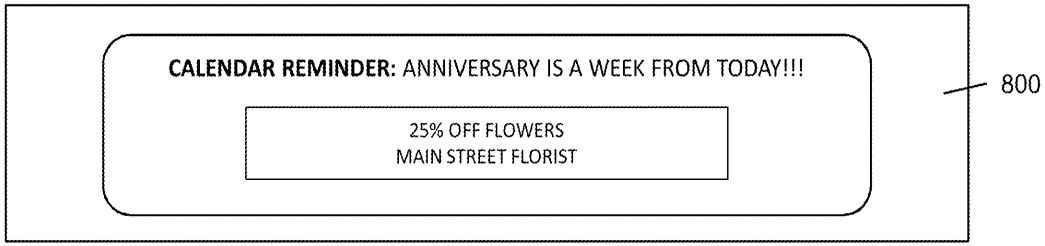


FIG. 8

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 15/50257

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06Q 30/00 (2015.01)
CPC - G06Q 30/0251, G06Q 30/02, G06Q 30/0277
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - G06Q 30/00 (2015.01)
CPC - G06Q 30/0251, G06Q 30/02, G06Q 30/0277

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC(8) - G06Q 30/00 (2015.01) (text search); USPC - 705/14.49, 705/14.61, 705/14.4 (text search)
CPC - G06Q 30/0251, G06Q 30/02, G06Q 30/0277, G06Q 30/0255, G06Q 30/0256 (text search)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, Google Scholar; Search terms used: ad advertisement reminder placement context time location purchase buy price bid highest accept

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ------ Y	US 2006/0242017 A1 (LIBES et al.) 26 October 2006 (26.10.2006), entire document, especially Fig. 1-3; para [0026], [0030], [0045], [0047], [0048], [0050], [0135], [0137], [0219], [0221], [0233], [0235]	1-4, 6-10, 14-18 ---------- 5, 11-13, 19, 20
Y	US 8,180,037 B1 (DELKER et al.) 15 May 2012 (15.05.2012), entire document, especially col 2, ln 16-29	5
Y	US 2012/0150620 A1 (MANDYAM et al.) 14 June 2012 (14.06.2012), entire document, especially para [0064]	11, 19
Y	US 2013/0254314 A1 (CHOW) 26 September 2013 (26.09.2013), entire document, especially Fig. 5; para [0058]	12, 20
Y	US 2014/0006951 A1 (HUNTER) 02 January 2014 (02.01.2014), entire document, especially para [0530]	13
A	US 2013/0006734 A1 (OCKO et al.) 03 January 2013 (03.01.2013), entire document	1-20
A	US 2002/0029186 A1 (ROTH et al.) 07 March 2002 (07.03.2002), entire document	1-20

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 November 2015 (02.11.2015)	14 DEC 2015
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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(72) Inventor; and
(71) Applicant : **KENNEWICK, Michael, R., Sr.** [US/US]; 13407 NE 37th Place, Bellevue, WA 98075 (US).

(74) Agents: **KOO, Hean, L.** et al.; Sheppard Mullin Richter & Hampton LLP, 2099 Pennsylvania Avenue, N.W., Suite 100, Washington, DC 20006 (US).

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(54) **Title**: SYSTEM AND METHOD OF MARKETING OF USER REQUESTS

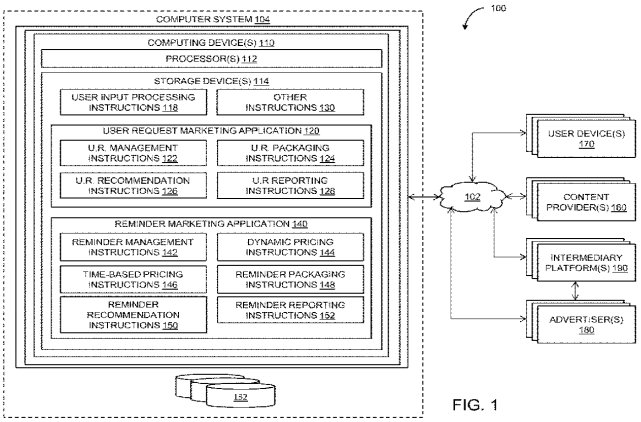


FIG. 1

(57) **Abstract**: In certain implementations, advertisers may be enabled to determine in real-time (as user requests are received from users) whether to include their advertisements (or other content) as part of responses to the user requests (e.g., queries, command, or other user requests). As an example, upon determining a user request based on a user input of a user, an advertisement opportunity associated with the user request may be provided to one or more advertisers. The advertisement opportunity may, for instance, comprise an opportunity to purchase an ad placement associated with the user request. Upon determining that an advertiser purchased the associated ad placement, the associated ad placement may be allocated for an advertisement associated with the advertiser so that a response to the user request will comprise an advertisement associated with the advertiser.

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System and Method of Marketing of User Requests

CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 62/051,282 filed September 16, 2014 entitled "SYSTEM AND METHOD OF MARKETING OF REMINDERS" and U.S. Provisional Patent Application Serial No. 62/051,288 filed September 16, 2014 entitled "SYSTEM AND METHOD OF MARKETING OF USER REQUESTS", the entireties of which are incorporated herein by reference.

FIELD OF THE INVENTION

[002] The invention relates to systems and methods of marketing of user requests and/or reminders (or other notifications).

BACKGROUND OF THE INVENTION

[003] Electronic user devices have emerged to become nearly ubiquitous in the everyday lives of many people. One of the reasons for this increased use is the convenience of receiving information with a user device. In an increasing global marketplace, advertisers are continually looking for new and effective ways to reach consumers. Recent technological advances in advertising include, for example, real-time bidding (RTB) of ad placements such that ad inventory is bought and sold on a per-impression basis. Typical ad bidding systems, however, do not provide advertisers with opportunities to purchase ad placements associated with individual user requests and/or reminders (or other notifications). These and other drawbacks exist.

SUMMARY OF THE INVENTION

[004] The invention relates to systems and methods of marketing of user requests and/or reminders (or other notifications). As an example, with respect to marketing of user requests, advertisers may be enabled to determine in real-time (as user requests are received from users) whether to include their advertisements (or other content) as part of responses to the user requests (e.g., queries, command, or other user requests). To assist the advertisers in

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making such determinations, information about the user requests may be determined, and made available to the advertisers along with the advertisement opportunity (to include their advertisements as part of responses to the user requests). Such information may, for instance, comprise a category related to a user request, a location related to the user request, a time related to the user request, a device type of a device at which the user request was made or at which a response to the user request will potentially be presented to a user, or other information. As used herein, an advertiser may comprise a business that is promoting their products or services, an independent marketer that is promoting products or services of other businesses, or other entity that is promoting products or services.

[005] In an implementation, an advertisement opportunity associated with a user request of a user may be provided to one or more advertisers (e.g., via a real-time bidding system). As an example, the advertisement opportunity may be provided to the advertisers after determining the user request based on one or more user inputs of the user, and may comprise an opportunity to purchase an ad placement associated with the user request. Upon determining that an advertiser purchased the associated ad placement, the associated ad placement may be allocated for an advertisement associated with the advertiser so that a response to the user request will comprise an advertisement associated with the advertiser. Thus, when a response to the user request is provided for presentation to the user, the response may comprise a particular advertisement associated with the advertiser based on the allocation of the associated ad placement.

[006] In an implementation, a response to a user request of a user may comprise a first portion that addresses the user request and a second portion that includes an advertisement associated with an advertiser (that purchased an ad placement associated with the user request). In one implementation, an advertisement opportunity associated with the user request may be provide to one or more advertisers (e.g., including the purchasing advertiser) before the first portion of the response is provided for presentation to the user. In another implementation, the associated ad placement may be allocated for an advertisement associated with the purchasing advertiser (e.g., so that a response to the user request will comprise an advertisement associated with the advertiser) before the first portion of the response is provided for presentation to the user. As such, the advertisement opportunity may

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be provided to advertisers and/or the associated ad placement may be allocated for an advertisement before the portion of the response that addresses the user request is presented to the user. In this way, an advertisement associated the purchasing advertiser may be ready to be presented to the user when the portion of the response that addresses the user request is presented to the user. Of course, in other implementations, the advertisement opportunity may be provided to advertisers and/or the associated ad placement may be allocated for an advertisement during or after the portion of the response that addresses the user request is presented to the user.

[007] In an implementation, a natural language input (e.g., utterance, gesture, etc.) of a user may be processed to determine a user request related to the user input. As an example, if the user input is a natural language utterance spoken by the user, the utterance may be processed by a speech recognition engine to recognize one or more words of the utterance. The recognized words may then be processed (e.g., along with context information associated with the user) by a natural language processing engine to determine a user request intended by the user when the user spoke the utterance. As a result of the processing of the recognized words and/or the context information, one or more categories related to the utterance (e.g., product category, service category, etc.), entity associations related to the utterance (e.g., organization name, brand name, etc.,), product or service names related to the utterance, or other information may be determined. In one scenario, such information (determined based on the processing of the recognized words and/or context information) may be provided with (or included as part of) an advertisement opportunity associated with the user request (that is determined based on the utterance) to assist the advertisers in determining whether to include their advertisements (or other content) as part of a response to the user request.

[008] In another scenario, such information (determined based on the processing of the recognized words and/or context information) may be utilized to select advertisers that are to be provided with an advertisement opportunity to include their advertisements (or other context) as part of a response to the user request (that is determined based on the utterance). For example, the selection of the advertisers to be provided with the advertisement opportunity may be based on the likelihood (or the extent) that an advertiser would be

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interested in placing their advertisement as part of a response to the user request. Comparison of information regarding the advertisers (e.g., products or services offered by the advertisers, categories in which the advertisers have explicitly indicated interest, locations in or times during which the advertisers would like to promote their products or services, devices types with which the advertisers would like to promote their products or services, etc.) and information related to the utterance may, for instance, be performed to facilitate the selection of the advertisers to be provided with the advertisement opportunity.

[009] Various other aspects of the invention will be apparent through the detailed description of the invention and the drawings attached hereto. It is also to be understood that both the foregoing general description and the following detailed description are exemplary and not restrictive of the scope of the invention. As used in the specification and in the claims, the singular form of "a", "an", and "the" include plural referents unless the context clearly dictates otherwise. In addition, as used in the specification and the claims, the term "or" means "and/or" unless the context clearly dictates otherwise.

BRIEF DESCRIPTION OF THE DRAWINGS

[010] FIG. 1 illustrates a system for marketing of user requests and/or reminders, according to an implementation of the invention.

[011] FIG. 2 illustrates a system for facilitating natural language processing, according to an implementation of the invention.

[012] FIG. 3 illustrates a data flow for a process of marketing user requests, according to an implementation of the invention.

[013] FIG. 4 illustrates a data flow for a process of marketing reminders, according to an implementation of the invention.

[014] FIG. 5 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with user requests, according to an implementation of the invention.

[015] FIG. 6 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with reminders, according to an implementation of the invention.

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[016] FIG. 7 illustrates a screenshot of a user interface which provides an advertisement associated with an advertiser that purchased an ad placement associated with a user request, according to an implementation of the invention.

[017] FIG. 8 illustrates a screenshot of a user interface which provides an advertisement associated with an advertiser that purchased an ad placement associated with a reminder, according to an implementation of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[018] In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the implementations of the invention. It will be appreciated, however, by those having skill in the art that the implementations of the invention may be practiced without these specific details or with an equivalent arrangement. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the implementations of the invention.

[019] FIG. 1 illustrates a system 100 of marketing of user requests and/or reminders, according to an implementation of the invention. A user request may comprise a command, a query, or other user request. A reminder may relate to scheduled appointments, task deadlines, relevant dates/times, relevant user needs, or other items. Reminders may be created by users or automatically on behalf of users. As an example, a user may initiate creation of a reminder by submitting a user request specifying creating of the reminder. In another example, system 100 may automatically create a reminder on behalf of a user without a user request that specifies creation of the reminder. System 100 may, for instance, predict a need for a reminder for a user based on information about the user, such as the user's birthday, anniversary, appointments or other scheduled events, user requests submitted by the user (e.g., requests that do not necessarily specify creation of the reminder), or other information.

[020] In an implementation, system 100 may provide one or more advertisement opportunities associated with one or more user requests and/or reminders (or other notifications) to one or more advertisers to facilitate purchase of ad placements with the user

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requests and/or reminders. As an example, the advertisement opportunities may comprise an opportunity to purchase an ad placement associated with a user request, an opportunity to purchase an ad placement associated with a reminder, or other opportunity. The advertisers may comprise businesses that are promoting their products or services, independent marketers that are promoting products or services of other businesses, or other entities that are promoting products or services.

[021] In one use case, if an advertiser purchases an ad placement associated with a user request, the associated ad placement may be allocated for one or more advertisements associated with the purchasing advertiser such that an advertisement associated with the purchasing advertiser may be provided for presentation to the user as at least part of a response to the user request.

[022] In another use case, if an advertiser purchases an ad placement associated with a reminder, the associated ad placement may be allocated for one or more advertisements associated with the purchasing advertiser such that an advertisement associated with the purchasing advertiser may be provided for presentation to the user with the reminder. An advertisement associated with the purchasing advertiser may, for instance, be presented to the user with the reminder upon receipt of an indication to present the reminder to the user (e.g., a user request to view the reminder, an automated trigger event to present the reminder to the user, or other indication).

[023] In an implementation, system 100 may provide advertisers an opportunity to purchase real-time ad placements associated with user requests. For example, upon receipt a user input indicating a user request, system 100 may provide an opportunity to purchase an ad placement associated with the user request to one or more advertiser, and allocate the associated ad placement for an advertisement associated with a purchasing advertiser. System 100 may then provide a response to a user request of a user for presentation to the user such that the response comprises a first portion that addresses the user request of the user and a second portion that includes an advertisement associated with the purchasing advertiser. As such, before a response comprising a portion that addresses a user request of a user is provided for presentation to the user: (i) an opportunity to purchase an ad placement associated with the user request may be provided to an advertiser; and/or (ii) the associated

ad placement may be allocated for an advertisement associated with the advertiser (e.g., upon the advertiser purchasing an associated ad placement) such that the response further comprises an advertisement associated with the advertiser when the response is provided for presentation to the user.

[024] In an implementation, an advertiser may purchase an ad placement (e.g., associated with a user request, associated with a reminder, etc.) by accepting an active offer for the ad placement, by submitting the highest bid during an auction for the ad placement, etc. In some implementations, purchasing of an ad placement by an advertiser may comprise an intermediary (e.g., using an intermediary platform) accepting an active offer for the ad placement or submitting the highest bid for the ad placement on behalf of the advertiser (e.g., based on a pre-negotiated agreement between the intermediary and the advertiser).

[025] In an implementation, an advertisement opportunity associated with a user request or a reminder may be provided to one or more advertisers based on a category associated with the user request or the reminder, a location associated with the user request or the reminder, a time associated with the user request or the reminder, a device type of a device at which the user request or a request for the reminder was made, a device type of a device at which a response to the user request or the reminder will potentially be presented to the user, or other parameter. In one scenario, for example, advertisers may be selected to receive the advertisement opportunity based on the likelihood (or the extent) that an advertiser would be interested in placing their advertisement as part of a response to the user request or with the reminder. Comparison of information regarding the advertisers and information related to the user request or the reminder may, for instance, be performed to facilitate the selection of the advertisers that are to receive the advertisement opportunity. As an example, information regarding the advertisers may comprise products or services offered by the advertisers, categories in which the advertisers have explicitly indicated interest, locations in or times during which the advertisers would like to promote their products or services, devices types (e.g., device operating system, device form factor, etc.) with which the advertisers would like to promote their products or services, or other information.

[026] In another scenario, advertisers may indicate or be assigned to one or more categories of advertisement opportunities to facilitate distribution of advertisement

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opportunities to the advertisers. As an example, the indicated or assigned categories of each advertiser may be considered as at least one factor in determining which advertisement opportunities are to be provided to the advertiser (e.g., by determining the likelihood that the advertiser would purchase an ad placement associated with the advertisement opportunity). As another example, the indicated or assigned categories may be utilized to distribute advertisement opportunities to advertisers such that the advertisers only receive advertisement opportunities related to categories in which they have explicitly indicated interest or to which they have been assigned.

[027] In an implementation, a purchase of an ad placement associated with a user request or a reminder by an advertiser may be based on a category associated the user request or the reminder, a location associated with the user request or the reminder, a time associated with the user request or the reminder, a device type of a device at which the user request or a request for the reminder is made, a device type of a device at which a response to the user request or the reminder will potentially be presented to the user, or other parameter. In one use case, for example, an intermediary platform (e.g., demand side platform) associated with a pizza restaurant may automatically accept offers of ad placements with user requests for food when the user requests are made from Sunday through Thursday (e.g., during which the pizza restaurant may be in need of customers), the user requests are made within 3 miles of the pizza restaurant, and the price of the ad placement is less than $0.25 (e.g., without user input specifying acceptance of those specific offers). In another use case, when the price of the ad placement is less than $0.50, an intermediary platform associated with a pizza restaurant may automatically accepts offers of ad placements with reminders regarding lunch or dinner that will potentially be presented to a user on a mobile phone (e.g., without user input specifying acceptance of those specific offers).

[028] Other uses of system 100 are described herein and still others will be apparent to those having skill in the art. Having described a high level overview of some of the system functions, attention will now be turned to various system components that facilitate these and other functions.

[029] System Components

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[030] System 100 may include a computer system 104, one or more content providers 160, one or more user devices 170, one or more advertisers 180, an advertising intermediary platform 190 and/or other components. Computer system 104 may interface with content provider(s) 160 to allow users to access content offered by content provider(s) 160, one or more advertisers and/or an advertising intermediary 190 to provide advertisements for presentation to users, and various interfaces of the user device(s) 170 such that users may interact with computer system 104.

[031] To facilitate these and other functions, computer system 104 may include one or more computing devices 110. Each computing device 110 may include one or more processors 112, one or more storage devices 114, and/or other components.

[032] Processor(s) 112 may be programmed by one or more computer program instructions, which may be stored in storage device(s) 114. The one or more computer program instructions may include, without limitation, a user request marketing application 120 and a reminder marketing application 140. User request marketing application 120 and/or reminder marketing application 140 may themselves include different sets of instructions that each program the processor(s) 112 (and therefore computer system 104) to perform one or more operations described herein. For example, user request marketing application 120 may include user request marketing management instructions 122, user request packaging instructions 124, user request recommendation instructions 126, user request reporting instructions 128, and/or other instructions 130 that program computer system 104. Reminder marketing application 140 may include reminder marketing management application 142, dynamic pricing instructions 144, time-based pricing instructions 146, reminder packaging instructions 148, reminder recommendation instructions 150, reminder reporting instructions 152, and/or other instructions 130 that program computer system 104. Other applications may, of course, include one or more of the instructions 118-152 to perform one or more operations as described herein.

[033] In some implementations, a given user device 170 may comprise a given computer device 110. As such, the given user device 170 may comprise processor(s) 112 that are programmed with one or more computer program instructions, such as user input processing instructions 118, user request marketing management instructions 122, user request

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packaging instructions 124, user request recommendation instructions 126, user request reporting instructions 128, reminder marketing management application 142, dynamic pricing instructions 144, time-based pricing instructions 146, reminder packaging instructions 148, reminder recommendation instructions 150, reminder reporting instructions 152, or other instructions 130.

[034] In one implementation, one or more advertisers 180 may establish relationships with an intermediary platform 190 to allocate advertisements to the ad placements associated with the user requests and/or reminders. Intermediary platform 190 may serve as an intermediary between advertisers wishing to purchase ad placements and publishers wishing to find advertisers for unused/unsold advertising opportunities. Intermediary platform 190 may store advertisements and information provided by advertisers 180. For example, advertisements may be uploaded from advertisers to the intermediary platform 190 for display in the user request and/or reminders for which ad placements have been purchased. In an implementation, intermediary platform 190 may receive, negotiate, or accept advertisement opportunities offered by system 100 to the one or more advertisers 180. In an implementation, the one or more advertisers 180 and the intermediary platform 190 may have pre-negotiated agreements which enable the intermediary platform 190 to accept and provide advertisements to system 100 on behalf of the advertisers 180. For example, intermediary platform 190 may accept offers or submits bids on behalf of the advertisers 180 based on pre-negotiated agreements for purchasing ad placements associated with user requests and/or reminders.

[035] As used hereinafter, for convenience, the foregoing instructions will be described as performing an operation, when, in fact, the various instructions may program processor(s) 112 (and thereafter computer system 104) to perform the operation. It should be appreciated that the various instructions are described individually as discreet sets of instructions by way of illustration and not limitation, as two or more of the instructions may be combined.

[036] User Input Processing

[037] In an implementation, user input processing instructions 118 may process one or more user inputs of a user to determine one or more user requests that are intended by the user when the user provided the user inputs (e.g., creation of a reminder or other user request).

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The user inputs may comprise an auditory input (e.g., received via a microphone), a visual input (e.g., received via a camera), a tactile input (e.g., received via a touch sensor device), an olfactory input, a gustatory input, a keyboard input, a mouse input, or other user input. As described herein elsewhere, user input processing instructions 118 may comprise instructions associated with one or more speech recognition engines (e.g., speech recognition engine(s) 220 of FIG. 2), one or more natural language processing engines (e.g., natural language processing engine(s) 230 of FIG. 2), or other components for processing user inputs to determine user requests related to the user inputs.

[038] In one use case, if the user input is a natural language utterance spoken by a user, the natural language utterance may be processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine a type of user request or reminder including one or more of a category associated with the user request or the reminder, a location at which the user request is made or with which the reminder is associated, a time at which the user request is made or with which the reminder is associated, a device type of a device at which the user request or the reminder was made, a device type of a device at which a response to the user request or the reminder will potentially be presented to the user, or other parameter.

[039] FIG. 2 illustrates a system 200 for facilitating natural language processing, according to an implementation of the invention. As shown in FIG. 2, system 200 may comprise input device(s) 210, speech recognition engine(s) 220, natural language processing engine(s) 230, application(s) 240, output device(s) 250, database(s) 132, or other components.

[040] In an implementation, one or more components of system 200 may comprise one or more computer program instructions of FIG. 1 and/or processor(s) 112 programmed with the computer program instructions of FIG. 1. As an example, speech recognition engine(s) 220 and/or natural language processing engine(s) 230 may comprise user input processing instructions 118 or other instructions 130 (e.g., grammar management instructions, profile management instructions, or other instructions).

[041] Input device(s) 210 may comprise an auditory input device (e.g., microphone), a visual input device (e.g., camera), a tactile input device (e.g., touch sensor), an olfactory input

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device, a gustatory input device, a keyboard, a mouse, or other input devices. Input received at input device(s) 210 may be provided to speech recognition engine(s) 220 and/or natural language processing engine(s) 230.

[042] Speech recognition engine(s) 220 may process one or more inputs received from input device(s) 210 to recognize one or more words represented by the received inputs. As an example, with respect to auditory input, speech recognition engine(s) 220 may process an audio stream captured by an auditory input device to isolate segments of sound of the audio stream. The sound segments (or a representation of the sound segments) are then processed with one or more speech models (e.g., acoustic model, lexicon list, language model, etc.) to recognize one or more words of the received inputs. Upon recognition of the words of received inputs, the recognized words may then be provided to natural language processing engine(s) 230 for further processing. In other examples, natural language processing engine(s) 230 may process one or more other types of inputs (e.g., visual input representing sign language communication, gestures, or other forms of communication) to recognize one or more words represented by the other types of inputs.

[043] Natural language processing engine(s) 230 may receive one or more inputs from input device(s) 210, speech recognition engine(s) 220, application(s) 240, database(s) 132, or other components. As an example, natural language processing engine(s) 230 may process inputs received from input device(s) 210, such as user inputs (e.g., voice, non-voice, etc.), location-based inputs (e.g., GPS data, cell ID, etc.), other sensor data input, or other inputs to determine context information associated with one or more user inputs. As another example, natural language processing engine(s) 230 may obtain grammar information, profile information, context information, or other information from database(s) 132. The obtained information (or context information determined based on inputs from input device(s) 210) may be processed to determine one or more user requests associated with one or more user inputs of a user. In yet another example, natural language processing engine(s) 230 may process one or more recognized words from speech recognition engine(s) 220 and other information (e.g., information from input device(s) 210, application(s) 240, and/or database(s) 132) to determine one or more user requests associated with one or more user inputs of a user.

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[044] In an implementation, natural language processing engine(s) 230 may solicit further inputs from a user by responding with a request for more information via output device(s) 250 if, for instance, a user request associated with a user input of a user cannot be determined with sufficient confidence, more information would helpful to process the user request, etc.

[045] In an implementation, upon determination of a user request of a user, natural language processing engine(s) 230 may determine an application 240 suitable for executing the user request, and provide the user request to the application for further processing. In one scenario, the application 240 may provide one or more results of the user request to output device(s) 250 for presentation to the user.

[046] In another scenario, the application 240 may provide the results of the user request to natural language processing engine(s) 230 for further processing. As an example, the results of the user request may comprise intermediate results that are provided as a parameter for another user request of the user that is to be executed at another application 240. As such, the natural language processing engine(s) 230 may generate the other user request based on the intermediate results, and provide the other user request to the other application 240. As another example, natural language processing engine(s) 230 may formulate a natural language response based on the results received from the application 240, and provide the natural language response to output device(s) 250 for presentation to the user.

[047] In an implementation, a given application 240 may obtain profile information, account information, or other information from database(s) 132 to authenticate a user before executing a user request of the user. As an example, the application 240 may be part of a given service provider. As such, the application 240 may determine whether the user has access to one or more services associated with the application 240 before executing the user request on behalf of the user.

[048] In an implementation, a given application 240 may obtain content from database(s) 132 and/or content provider(s) 160 to provide one or more results of a user request of a user. In one use case, where the user request comprises a command to play a media item (e.g., song, video clip, movie, etc.), and the application 240 comprises a media stream application, the application 240 may obtain the media item from a given content provider(s) 160 and stream the media item to output device(s) 250 for presentation to the user.

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[049] In an implementation, natural language processing engine(s) 230, application(s) 240, or other components may store information in database(s) 132 for later use by natural language processing engine(s) 230, application(s) 240, or other components. As an example, as described in further detail elsewhere herein, natural language processing engine(s) 230 may store information regarding user inputs in database(s) 132 and/or update profile information, grammar information, or other information in database(s) 132 based on the information regarding the user inputs.

[050] User Request Marketing Management

[051] In an implementation, user request marketing management instructions 122 may provide one or more advertisement opportunities related to user requests to one or more advertisers. As an example, a natural language utterance, a gesture (or other body movements), or other user input may be received from a user and processed to determine a user request related to the user input. Based on the user request, user request marketing management instructions 122 may provide one or more advertisement opportunity related to the user request to one or more advertisers.

[052] In an implementation, user request marketing management instructions 122 may provide an advertiser with an opportunity to purchase ad placement with real-time user requests. Specifically, an ad placement associated with a user request may be offered to one or more advertisers (e.g., via an intermediary platform) in real-time as the user request is being processed and before a response addressing the user request is provided to the user. For example, in response to receiving a user request, user request marketing management instructions 122 may provide an advertiser an opportunity to purchase an ad placement located within a response to the user request before the response addressing the user request is provided to the user. An advertiser may, for instance, purchase the ad placement by being the first advertiser to accept an offer for the ad placement, by submitting the highest bid for the ad placement, etc. The offer and/or purchase of the ad placement may be based on a category associated with the user request, a location at which the user request is made, a time at which the user request is made, a device type of a device at which the user request was made or at which a response to the user request will potentially be presented to a user, or other parameter.

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[053] In an implementation, user request marketing management instructions 122 may provide an advertisement opportunity to advertisers based on parameters associated with the user request and parameters associated with the advertiser. For example, particular types of advertisement opportunities associated with user requests are presented to advertisers that seek to promote products or services related to the user requests. In one use case, user request marketing management instructions 122 may determine a category associated with the user request and provide an advertisement opportunity associated with the user request to only those advertisers that offer products or services related to the category associated with the user request. In another use case, the category associated with the user request may be utilized as at least one factor in determining which advertisers are to be provided with the associated advertisement opportunity.

[054] In an implementation, user request marketing management instructions 122 may enable an advertiser (via an intermediary platform) to allocate an advertisement to an ad placement associated with the user request. For example, after purchasing an ad placement associated with a user request, an advertiser may allocate an advertisement to the ad placement so that the advertisement will be provided along with (or as part of) a response addressing the user request for presentation to a user that initiated the user request. In one use case, the allocated advertisement may be presented to the user before or after a response to the user request (or a portion thereof that addresses the user request) is presented to the user (e.g., where both the advertisement and the portion addressing the user request are provided in an audio format). In another use case, the allocated advertisement and the portion addressing the user request may be simultaneously presented to the user (e.g., on a web page).

[055] User Request Marketing Packages

[056] In an implementation, user request packaging instructions 124 provide an advertiser with the opportunity to purchase one or more of a plurality of user request packages where each user request package may be associated with a certain number of ad placements with one or more types of user requests. For example, each type of user request may comprise one or more of a category associated with the user request, a location at which the user request is made, a time at which the user request is made, a device type of a device at which the user

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request was made or at which a response to the user request will potentially be presented to a user, or other parameter. User request packages may, for instance, be purchased using a store model, an auction model, or other model. In an implementation, user request packaging instructions 124 may provide the user request packages to advertisers based on parameters associated with the user request package and parameters associated with the advertiser. For example, particular types of user request packages are presented to advertisers that seek to promote related products or services.

[057] User Request Marketing Recommendations

[058] In an implementation, user request recommendation instructions 126 may provide recommendations of user request packages for an advertiser based on parameters associated with the user request packages and parameters associated with the advertiser. As an example, an owner of a pizza restaurant may indicate that the pizza restaurant is in need of customers from Sunday through Thursday and that the pizza restaurant does not deliver. As such, the owner may be recommended user request packages that comprise ad placements with user requests related to a search for food that will be submitted by users from Sunday through Thursday while the users are at locations within 3 miles from the pizza restaurant.

[059] User Request Marketing Reporting

[060] In an implementation, user request reporting instructions 128 may generate reports regarding user requests, and provide the reports to advertisers along with an opportunity to purchase recommended user request packages. For example, the reports may indicate the criteria used to determine the recommended user request packages for the advertisers (that are provided with the reports). In this way, advertisers will understand why certain user request packages are recommended for them, and may be enticed to purchase the recommended user request packages as a result.

[061] Reports may, for instance, indicate the number or frequency of user requests (e.g., with respect to request type) location of requests, time of requests, device types of devices at which requests were made or later presented to users, click-through rate, return of investment, or other performance measurement of ad placements with user requests with respect to request type, etc. In one use case, an owner of a pizza restaurant may be recommended user request packages that comprise user requests related to upcoming sport

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games that will be submitted by users within 3 miles from the pizza restaurant. In addition, a report indicating that users who queried online for information regarding upcoming sports games while the users were within 3 miles from the pizza restaurant frequently purchase pizzas from nearby restaurants within a few hours of their informational queries.

[062] Reminder Marketing Management

[063] In an implementation, reminder marketing management application 142 may provide one or more advertisement opportunities related to reminders to one or more advertisers. Reminders may, for example, relate to scheduled appointments, task deadlines, relevant dates/times, relevant user needs, or other items. Reminders may be created by users or automatically on behalf of users. As an example, a user may initiate creation of a reminder by submitting a user request specifying creating of the reminder. In another example, a reminder may be created on behalf of a user without a user request that specifies creation of the reminder. A need for a reminder may, for instance, be predicted for a user based on information about the user, such as the user's birthday, anniversary, appointments or other scheduled events, user requests submitted by the user (e.g., requests that do not necessarily specify creation of the reminder), or other information.

[064] In an implementation, reminder marketing management application 142 may provide advertisers with an opportunity to purchase an ad placement associated with a reminder upon creation of the reminder. As an example, in response to a reminder being created, and without further user input after creation of the reminder, reminder marketing management instructions 142 may provide one or more advertisers an opportunity to purchase an ad placement located within the reminder. An advertiser may, for instance, purchase the ad placement by being the first advertiser to accept an offer for the ad placement, by submitting the highest bid for the ad placement, etc. The offer and/or purchase of the ad placement may be based on a category associated with the reminder, a location associated with the reminder, a time associated with the reminder, a device type of a device at which a request for the reminder was made or at which the reminder will potentially be presented to a user, or other parameter.

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[065] In an implementation, reminder marketing management application 142 provides the advertisement opportunity to advertisers based on parameters associated with the reminder and parameters associated with the advertiser. For example, particular types of advertisement opportunities associated with reminders are presented to advertisers that seek to promote products or services related to the reminders. In one use case, reminder marketing management instructions 142 may determine a category associated with the reminder and provide an advertisement opportunity associated with the reminder to only those advertisers that offer products or services related to the category associated with the reminder. In another use case, the category associated with the reminder may be utilized as at least one factor in determining which advertisers are to be provided with the associated advertisement opportunity.

[066] In an implementation, reminder marketing management application 142 may enable an advertiser (via an intermediary platform) to allocate an advertisement to an ad placement associated with the reminder. For example, after purchasing the ad placement associated with a reminder, an advertiser may allocate an advertisement to the ad placement so that the advertisement will be provided along with (or as part of) the reminder for presentation to a user associated with the reminder.

[067] Dynamic Reminder Marketing

[068] In an implementation, dynamic pricing instructions 144 may dynamically change prices associated with ad placement on a reminder based on length of time from creation of the reminder, length of time from an end time associated with the reminder (e.g., expiration of the reminder), length of time from a predetermined time (e.g., at which presentation of the reminder to the associated user is triggered), a number of remaining scheduled presentations of the reminder to the user (e.g., the number of times the reminder is scheduled to be automatically presented to the user before an end time associated with the reminder), etc.

[069] In one use case, the price of placing an advertisement with a reminder may be decreased when there is only a certain amount of time left before expiration of the reminder (e.g., before the occurrence of the event associated with the reminder). As a result of the discounted price, the ad placement of the advertisement may remain (or become more)

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enticing for advertisers looking to purchase ad placements with reminders (e.g., even when their advertisement will only be placed with a reminder for a short period of time).

[070] In another use case, the price of placing an advertisement with a reminder may be increased when there is only a certain amount of time left before expiration of the reminder. As an example, where advertisers are provided with the opportunity to purchase an ad placement with the reminder for immediate placement of their advertisement for a predetermined time period less than the remaining duration of the reminder, the last few days, hours, or other remaining time period associated with the reminder may be more valuable to advertisers than other time periods associated with the reminder.

[071] In yet another use case, the price of placing an advertisement with a reminder may change as the number of remaining scheduled "alerts" associated with the reminder change. As an example, the price may decrease (or increase) as the number of remaining alerts decrease. As another example, the price may increase (or decrease) as the number of remaining alerts increase (e.g., if the user associated with the reminder modifies the number of alerts of the reminder after creation of the reminder). In this way, the price of the ad placement may reflect the anticipated number of times that an advertisement of a purchasing advertiser will be presented to the user associated with the reminder.

[072] Time-Based Reminder Marketing

[073] In an implementation, time-based pricing instructions 146 may provide advertisers with the opportunity to purchase ad placement on reminders for a specified duration (e.g., a remaining time associated with the reminder, a predetermined time period less than the remaining time, etc.). An advertiser may, for instance, purchase an option to place advertisements for a few weeks, days, hours, etc., during which the reminder is still active. The available periods during which an advertisement can be placed with a reminder may comprise the beginning, the middle, the end, or other time period of the reminder.

[074] In an implementation, time-based pricing instructions may set prices such that prices associated with ad placement on a reminder during one time period of the reminder may be different than prices associated with ad placement on the reminder during another time period (e.g., the last few days, hours, etc., associated with the reminder may be more expensive to purchase than other time periods of the reminder).

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[075] In an implementation, an ad placement with a reminder may end when the reminder is expired. For example, a reminder may expire when the event or user need related to the reminder is over. In an implementation, an advertisement may continue to be placed with a reminder even after the reminder's original expiration date if the expiration date of the reminder is extended. That is, the ad placement may dynamically be extended based on the extension of the reminder. As an example, an event associated with the reminder may be rescheduled for a later date, and the reminder (and its associated parameters) may be modified (e.g., automatically without user input specifying the modification to the reminder, manually by a user, etc.) to reflect the later date.

[076] Reminder Marketing Packages

[077] In an implementation, reminder packaging instructions 148 may provide an advertiser with the opportunity to purchase one or more of a plurality of reminder packages where each reminder package may be associated with a certain number of ad placements with one or more types of reminders. For example, each type of reminder may comprise one or more of a category associated with the reminder, a location associated with the reminder, a time associated with the reminder (e.g., date, time of day, etc.), a device type of a device at which a request for the reminder was made or at which the reminder will potentially be presented to a user, or other parameter. User request packages may, for instance, be purchased via a store model, an auction model, or other model.

[078] In an implementation, reminder packaging instructions 148 may provide the reminder packages to advertisers based on parameters associated with the reminder package and parameters associated with the advertiser. For example, particular types of reminder packages are presented to advertisers that seek to promote related products or services.

[079] Reminder Marketing Recommendations

[080] In an implementation, reminder recommendation instructions 150 may provide recommendations of reminder packages for an advertiser based on parameters associated with the reminder packages and parameters associated with the advertiser. As an example, a tire retailer may be recommended reminder packages that comprise ad placements with reminders related to tire purchases based on a determination that the tire retailer sells tires (e.g., a reminder to replace tires when the associated user's tires reaches their treadlife). As

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another example, the reminder packages may be recommended for the tire retailer further based on a location of the tire retailer. In particular, for instance, the reminder packages may comprise ad placements with tired-purchase-related reminders associated with users that reside within a proximity threshold distance from the location of the tire retailer.

[081] Reminder Marketing Reporting

[082] In an implementation, reminder reporting instructions 152 may generate reports regarding reminders, and provide the reports to advertisers along with an opportunity to purchase recommended reminder packages. For example, the reports may indicate the criteria used to determine the recommended reminder packages for the advertisers (that are provided with the reports). In this way, advertisements will understand why certain reminder packages are recommended for them, and may be enticed to purchase the recommended reminder packages as a result.

[083] Reports may, for instance, indicate the number or frequency of reminders (e.g., with respect to reminder type, location, time, device types, or other parameters), location associated with the reminders, time associated with the reminders, device types of devices at which reminders were made or later presented to users, click-through rate, return of investment, or other performance measurement of ad placements with user requests with respect to request type, etc. In one use case, a tire retailer may be provided with a report that indicate the click-through rate and/or the return of investment of tire-related advertisements placed with tire-related reminders of users that reside near the tire retailer (e.g., within a proximity threshold distance). In addition, along with the report, the tire retailer may be recommended reminder packages that comprise ad placements with tire-purchase-related reminders of users that reside near the tire retailer.

[084] Examples of System Architectures and Configurations

[085] Different system architectures may be used. For example, all or a portion of user request marketing application 120 and reminder marketing application 140 may be executed on a user device. In other words, computing device 110 as illustrated may include a user device operated by the user. In implementations where all or a portion of user request marketing application 120 and reminder marketing application 140 are executed on the user

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device, market user requests and reminders, and/or perform other functions/operations of user request marketing application 120 and reminder marketing application 140.

[086] All or a portion of user request marketing application 120 and reminder marketing application 140 may be executed on a server device. In other words, computing device 110 as illustrated may include a server device that obtains a user request from a user device operated by the user. In implementations where all or a portion of user request marketing application 120 and reminder marketing application 140 are executed on the server device, market user requests and reminders, and/or perform other functions/operations of user request marketing application 120 and reminder marketing application 140.

[087] Although illustrated in FIG. 1 as a single component, computer system 104 may include a plurality of individual components (e.g., computer devices) each programmed with at least some of the functions described herein. In this manner, some components of computer system 104 may perform some functions while other components may perform other functions, as would be appreciated. The one or more processors 112 may each include one or more physical processors that are programmed by computer program instructions. The various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as the processor(s) 112 are programmed to perform the functions described herein.

[088] It should be appreciated that although the various instructions are illustrated in FIG. 1 as being co-located within a single computing device 110, one or more instructions may be executed remotely from the other instructions. For example, some computing devices 110 of computer system 104 may be programmed by some instructions while other computing devices 110 may be programmed by other instructions, as would be appreciated. Furthermore, the various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as processor(s) 112 are programmed to perform the functions described herein.

[089] The description of the functionality provided by the different instructions described herein is for illustrative purposes, and is not intended to be limiting, as any of instructions may provide more or less functionality than is described. For example, one or more of the instructions may be eliminated, and some or all of its functionality may be provided by other

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ones of the instructions. As another example, processor(s) 112 may be programmed by one or more additional instructions that may perform some or all of the functionality attributed herein to one of the instructions.

[090] The various instructions described herein may be stored in a storage device 114, which may comprise random access memory (RAM), read only memory (ROM), and/or other memory. The storage device may store the computer program instructions (e.g., the aforementioned instructions) to be executed by processor(s) 112 as well as data that may be manipulated by processor(s) 112. The storage device may comprise floppy disks, hard disks, optical disks, tapes, or other storage media for storing computer-executable instructions and/or data.

[091] The various components illustrated in FIG. 1 may be coupled to at least one other component via a network 102, which may include any one or more of, for instance, the Internet, an intranet, a PAN (Personal Area Network), a LAN (Local Area Network), a WAN (Wide Area Network), a SAN (Storage Area Network), a MAN (Metropolitan Area Network), a wireless network, a cellular communications network, a Public Switched Telephone Network, and/or other network. In FIG. 1 and other drawing Figures, different numbers of entities than depicted may be used. Furthermore, according to various implementations, the components described herein may be implemented in hardware and/or software that configure hardware.

[092] User device(s) may include a device that can interact with computer system 104 through network 102. Such user device(s) may include, without limitation, a tablet computing device, a smartphone, a laptop computing device, a desktop computing device, a network-enabled appliance such as a "Smart" television, a vehicle computing device, and/or other device that may interact with computer system 104.

[093] The various databases 132 described herein may be, include, or interface to, for example, an Oracle™ relational database sold commercially by Oracle Corporation. Other databases, such as Informix™, DB2 (Database 2) or other data storage, including file-based (e.g., comma or tab separated files), or query formats, platforms, or resources such as OLAP (On Line Analytical Processing), SQL (Structured Query Language), a SAN (storage area network), Microsoft Access™, MySQL, PostgreSQL, HSpace, Apache Cassandra, MongoDB, Apache CouchDB™, or others may also be used, incorporated, or accessed. The database may

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comprise one or more such databases that reside in one or more physical devices and in one or more physical locations. The database may store a plurality of types of data and/or files and associated data or file descriptions, administrative information, or any other data. The database(s) 132 may be stored in storage device 114 and/or other storage that is accessible to computer system 104.

[094] Example Flow Diagrams

[095] The following flow diagrams describe operations that may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[096] FIG. 3 illustrates a data flow for a process of marketing user requests, according to an implementation of the invention. The various processing data flows depicted in FIG. 3 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[097] In an implementation, a user request generated by a user device 170 may be provided to a computer system 104. In response to receiving the user request, the computer system 104 may provide an advertisement opportunity to an intermediary platform 190 and/or one or more advertisers 180. In response to purchasing the advertising opportunity (e.g., by an advertiser 180, by the intermediary platform 190 on behalf of the advertiser 180, etc.), the intermediary platform 190 and/or a purchasing advertiser 180 may provide an advertisement to the computer system 104. If the intermediary platform 190 and/or the advertisers 180 choose not to purchase the advertisement opportunity, the computer system 104 may not

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receive an advertisement from them. In response to receiving an advertisement from the intermediary platform 190 and/or the purchasing advertiser 180, the computer system 104 may provide a response to the user request with the advertisement to the user device 170.

[098] FIG. 4 illustrates a data flow for a process of marketing reminders, according to an implementation of the invention. The various processing data flows depicted in FIG. 4 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[099] In an implementation, a reminder created by a user device 170 (or a request to create the reminder) may be provided to a computer system 104. In response to receiving the reminder (or the create request), the computer system 104 may provide an advertisement opportunity to an intermediary platform 190 and/or one or more advertisers 180. In response to purchasing the advertising opportunity (e.g., by an advertiser 180, by the intermediary platform 190 on behalf of the advertiser 180, etc.), the intermediary platform 190 and/or a purchasing advertiser 180 may provide an advertisement to the computer system 104. If the intermediary platform 190 and/or the advertisers 180 choose not to purchase the advertisement opportunity, the computer system 104 may not receive an advertisement from them. In response to receiving an advertisement from the intermediary platform 190 and/or the purchasing advertiser 180, the computer system 104 may provide the advertisement with the reminder for presentation to the user.

[0100] FIG. 5 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with user requests, according to an implementation of the invention. The various processing data flows depicted in FIG. 5 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted.

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Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[0101] In an operation 502, a natural language utterance of a user may be processed to determine a user request related to the natural language utterance. As an example, a user input comprising the natural language utterance may be received and processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine the user request related to the natural language utterance.

[0102] In an operation 504, a category associated with the natural language utterance may be determined based on one or more words of the utterance, context information associated with the utterance, or other information. As a result of this determination, for instance, the user request (determined based on the natural language utterance) may be identified as being related to the category associated with the natural language utterance.

[0103] In an operation 506, an advertisement opportunity associated with the user request may be provided to one or more advertisers based on the category associated with the natural language utterance. For example, the advertisement opportunity may provide an advertiser an opportunity to purchase an ad placement associated with the user request with which the advertiser can place advertisements (or other content) to promote their products or services. The opportunity may, for instance, be provided to advertisers that have indicated an interest in purchasing ad placements associated with user requests related to the determined category. In one implementation, the advertisement opportunity may be provided to an advertiser in real-time as the user request is being processed and before a response addressing the user request is provided for presentation to the user.

[0104] In an operation 508, a determination that a first advertiser purchased an ad placement associated with the user request (responsive to the advertisement opportunity) may be effectuated. As an example, an advertiser may purchase an ad placement associated with the user request by accepting an active offer for the ad placement, by submitting the highest bid

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for the ad placement during an auction for the ad placement, etc. In some implementations, purchasing of an ad placement by an advertiser may comprise an intermediary (e.g., intermediary platform 190) accepting an active offer for the ad placement or submitting the highest bid on behalf of the advertiser (e.g., based on a pre-negotiated agreement between the intermediary and the advertiser).

[0105] In an operation 510, an ad placement associated with the user request may be allocated for an advertisement associated with the first advertiser. The allocation may, for instance, be based on the determination that the first advertiser purchased an ad placement associated with the user request.

[0106] In an operation 512, a response to the user request that comprises a first advertisement associated with the first advertiser may be provided for presentation to the user based on the allocation.

[0107] FIG. 6 illustrates a flow diagram for a method of facilitating purchase of ad placements associated with reminders, according to an implementation of the invention. The various processing data flows depicted in FIG. 6 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[0108] In an operation 602, a reminder associated with a user may be identified. As an example, the identified reminder may have been created by the user or automatically created on behalf of the user without a user request to create the reminder. In one use case, with respect to user creation of a reminder, a user may initiate the creation of a reminder via speech, for instance, by providing a natural language utterance related to the reminder that the user desires to be created. The natural language utterance may be received and processed by a speech recognition engine to recognize one or more words of the natural language

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utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to create the reminder.

[0109] In an operation 604, an advertisement opportunity associated with the reminder may be provided to one or more advertisers. For example, the advertisement opportunity may provide an advertiser an opportunity to purchase an ad placement associated with the reminder with which the advertiser can place advertisements to promote their products or services. In one implementation, the price of an ad placement associated with the reminder may dynamically change based on a length of time from creation of the reminder, length of time from an end time associated with the reminder (e.g., expiration of the reminder), length of time from a predetermined time (e.g., at which presentation of the reminder to the associated user is trigger), a number of remaining scheduled presentations of the reminder to the user (e.g., the number of times the reminder is scheduled to be automatically presented to the user before an end time associated with the reminder), etc. In another implementation, the advertisement opportunity may comprise an opportunity to purchase an ad placement that allows for placement of an advertisement for a predetermined duration (e.g., less than a remaining time associated with the reminder, equal to the remaining time, etc.).

[0110] In an operation 606, a determination that a first advertiser purchased an ad placement associated with the reminder (responsive to the advertisement opportunity) may be effectuated. As an example, an advertiser may purchase an ad placement associated with the reminder by accepting an active offer for the ad placement, by submitting the highest bid for the ad placement during an auction for the ad placement, etc. In some implementations, purchasing of an ad placement by an advertiser may comprise an intermediary (e.g., intermediary platform 190) accepting an active offer for the ad placement or submitting the highest bid on behalf of the advertiser (e.g., based on a pre-negotiated agreement between the intermediary and the advertiser).

[0111] In an operation 608, an ad placement associated with the reminder may be allocated for an advertisement associated with the first advertiser. The allocation may, for instance, be based on the determination that the first advertiser purchased an ad placement associated with the reminder.

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[0112] In an operation 610, an indication to provide the reminder for presentation to the user may be received. As an example, the indication may be based on a user request to view the reminder. As another example, the indication may be based on a time-based trigger (e.g., triggering on a periodic basis, at one or more predetermined times, etc.), a location-based trigger (e.g., triggering when the user is within proximity of one or more predetermined locations), a keyword-based trigger (e.g., triggering when one or more predetermined keywords are detected), or other trigger.

[0113] In an operation 612, a first advertisement associated with the first advertiser may be provided for presentation to the user with the reminder based on the received indication (to provide the reminder for presentation to the user) and the allocation.

[0114] Example Screenshots

[0115] FIG. 7 illustrates a screenshot 700 of a user interface which provides an advertisement associated with an advertiser that purchased an ad placement associated with a user request, according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. With respect to screenshot 700, a user may provide a natural language input (e.g., natural language utterance or other input) indicating a user request to search for restaurants from which the user can order pizza. In response to the natural language input, an application associated with the depicted user interface may provide an advertisement opportunity related to the user request to one or more advertisers. As an example, the advertisement opportunity may enable advertisers to purchase an ad placement associated with the user request that allows a purchasing advertiser to place advertisements to market their products or services. If the advertisement opportunity is purchased by an advertiser, an advertisement associated with the advertiser may be provided in a response to the user request for presentation to the user. As depicted in screenshot 700, the response to the user request may include results for pizza restaurants nearby and an advertisement of a pizza deal for one of the nearby restaurants (e.g., Mama's Pizza). The advertisement may, for instance, be associated with a restaurant for which an intermediary purchased an ad placement associated with the user request.

[0116] FIG. 8 illustrates a screenshot 800 of a user interface which provides an advertisement which provides an advertisement associated with an advertiser that purchased an ad

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placement associated with reminder, according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. With respect to screenshot 800, a user may create a reminder to remind the user of an anniversary (e.g., wedding anniversary). In response to receiving a reminder request from the user, an application associated with the depicted user interface may provide an advertisement opportunity related to the reminder to one or more advertisers. As an example, the advertisement opportunity may enable advertisers to purchase an ad placement associated with the reminder that allows a purchasing advertiser to place advertisements to market their products or services. If the advertisement opportunity is purchased by an advertiser, an advertisement associated with the advertiser is provided in (or with) the reminder (e.g., for at least a predetermined number of times, a predetermined duration, etc.). As depicted in screenshot 800, the reminder may include a message about the user's upcoming anniversary and an advertisement providing a deal on flowers. The advertisement may, for instance, be associated with a business for which an intermediary purchased an ad placement associated with the reminder.

[0117] Other implementations, uses and advantages of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. The specification should be considered exemplary only, and the scope of the invention is accordingly intended to be limited only by the following claims.

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What is claimed is:

1. A method for facilitating purchase of ad placements associated with user requests, the method being implemented on a computer system having one or more physical processors programmed with computer program instructions which, when executed, perform the method, the method comprising:

determining, by the computer system, one or more user requests from a user;

providing, by the computer system, an advertisement opportunity associated with the one or more user requests to one or more advertisers, wherein the advertisement opportunity comprises an opportunity to purchase an ad placement associated with the one or more user requests;

determining, by the computer system, that the first advertiser purchased an ad placement associated with the one or more user requests;

allocating, by the computer system, an ad placement associated with the one or more user requests for an advertisement associated with the first advertiser based on the determination that the first advertiser purchased an ad placement associated with the one or more user requests; and

providing, by the computer system, a response to the one or more user requests for presentation to the user, wherein the response comprises a first advertisement associated with the first advertiser based on the allocation.

2. The method of claim 1, further comprising:

receiving, at the computer system, a natural language utterance of the user,

wherein determining the one or more user requests comprises determining the one or more user requests based on the natural language utterance, and

wherein providing the advertisement opportunity comprises providing the advertisement opportunity to the one or more advertisers based on the natural language utterance.

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3. The method of claim 2, further comprising:

determining, by the computer system, a category associated with the natural language utterance,

wherein providing the advertisement opportunity comprises providing the advertisement opportunity to the one or more advertisers based on the category associated with the natural language utterance.

4. The method of claim 3, further comprising:

performing, by the computer system, speech recognition on the natural language utterance to recognize one or more words of the natural language utterance,

wherein determining the category comprises determining the category based on the one or more recognized words.

5. The method of claim 1, wherein providing the advertisement opportunity comprises providing the advertisement opportunity based on one or more of a location associated with the one or more user requests, a time associated with the one or more user requests, or a device type of a device at which the user request will potentially be presented to the user.

6. The method of claim 1, wherein determining that the first advertiser purchased an ad placement associated with the one or more user requests comprises determining that the first advertiser purchased an ad placement associated with the one or more user requests based on the first advertiser accepting a price associated with the advertisement opportunity.

7. The method of claim 1, wherein determining that the first advertiser purchased an ad placement associated with the one or more user requests comprises determining that the first advertiser purchased an ad placement associated with the one or more user requests based on the first advertiser placing a highest bid during an auction for an ad placement associated with the one or more user requests.

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8. The method of claim 1, wherein the response comprises a first portion that addresses the one or more user requests and a second portion that includes the first advertisement, and wherein providing the advertisement opportunity comprises providing, before the first portion of the response is provided for presentation to the user, the advertisement opportunity to the one or more advertisers.

9. The method of claim 8, wherein allocating an ad placement associated with the one or more user requests for an advertisement associated with the first advertiser comprises allocating, before the first portion of the response is provided for presentation to the user, an ad placement associated with the one or more user requests for an advertisement associated with the first advertiser based on the determination that the first advertiser purchased an ad placement associated with the one or more user requests.

10. The method of claim 1, wherein the one or more user requests comprise at least one of a query of the user or a command of the user.

11. A system for facilitating purchase of ad placements associated with user requests, the system comprising:

one or more physical processors programmed with computer program instructions which, when executed, cause the one or more physical processors to:

determine one or more user requests from a user;

provide an advertisement opportunity associated with the one or more user requests to one or more advertisers, wherein the advertisement opportunity comprises an opportunity to purchase an ad placement associated with the one or more user requests;

determine that the first advertiser purchased an ad placement associated with the one or more user requests;

allocate an ad placement associated with the one or more user requests for an advertisement associated with the first advertiser based on the determination that the first advertiser purchased an ad placement associated with the one or more user

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requests; and

provide a response to the one or more user requests for presentation to the user, wherein the response comprises a first advertisement associated with the first advertiser based on the allocation.

12. The system of claim 11, wherein the one or more physical processors are further caused to:

receive a natural language utterance of the user,

wherein determining the one or more user requests comprises determining the one or more user requests based on the natural language utterance, and

wherein providing the advertisement opportunity comprises providing the advertisement opportunity to the one or more advertisers based on the natural language utterance.

13. The system of claim 12, wherein the one or more physical processors are further caused to:

determine a category associated with the natural language utterance,

wherein providing the advertisement opportunity comprises providing the advertisement opportunity to the one or more advertisers based on the category associated with the natural language utterance.

14. The system of claim 13, wherein the one or more physical processors are further caused to:

perform speech recognition on the natural language utterance to recognize one or more words of the natural language utterance,

wherein determining the category comprises determining the category based on the one or more recognized words.

15. The system of claim 11, wherein providing the advertisement opportunity comprises providing the advertisement opportunity based on one or more of a location associated with

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the one or more user requests, a time associated with the one or more user requests, or a device type of a device at which the user request will potentially be presented to the user.

16. The method of claim 11, wherein determining that the first advertiser purchased an ad placement associated with the one or more user requests comprises determining that the first advertiser purchased an ad placement associated with the one or more user requests based on the first advertiser accepting a price associated with the advertisement opportunity.

17. The system of claim 11, wherein determining that the first advertiser purchased an ad placement associated with the one or more user requests comprises determining that the first advertiser purchased an ad placement associated with the one or more user requests based on the first advertiser placing a highest bid during an auction for an ad placement associated with the one or more user requests.

18. The system of claim 11, wherein the response comprises a first portion that addresses the one or more user requests and a second portion that includes the first advertisement, and wherein providing the advertisement opportunity comprises providing, before the first portion of the response is provided for presentation to the user, the advertisement opportunity to the one or more advertisers.

19. The system of claim 18, wherein allocating an ad placement associated with the one or more user requests for an advertisement associated with the first advertiser comprises allocating, before the first portion of the response is provided for presentation to the user, an ad placement associated with the one or more user requests for an advertisement associated with the first advertiser based on the determination that the first advertiser purchased an ad placement associated with the one or more user requests.

20. The system of claim 12, wherein the one or more user requests comprise at least one of a query of the user or a command of the user.

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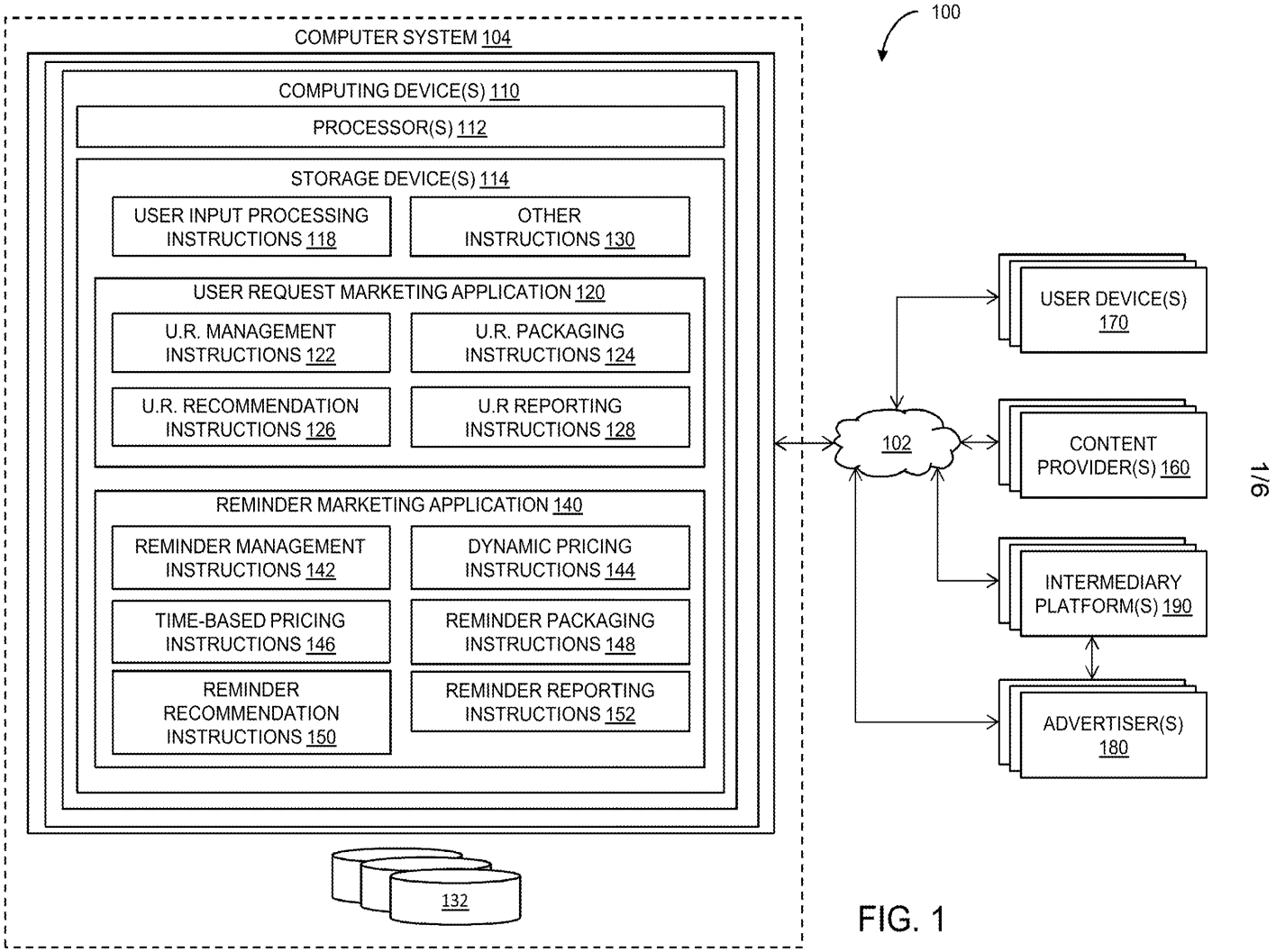

100
COMPUTER SYSTEM 104
COMPUTING DEVICE(S) 110
PROCESSOR(S) 112
STORAGE DEVICE(S) 114
USER INPUT PROCESSING INSTRUCTIONS 118
OTHER INSTRUCTIONS 130
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USER DEVICE(S) 170
CONTENT PROVIDER(S) 160
INTERMEDIARY PLATFORM(S) 190
ADVERTISER(S) 180

FIG. 1

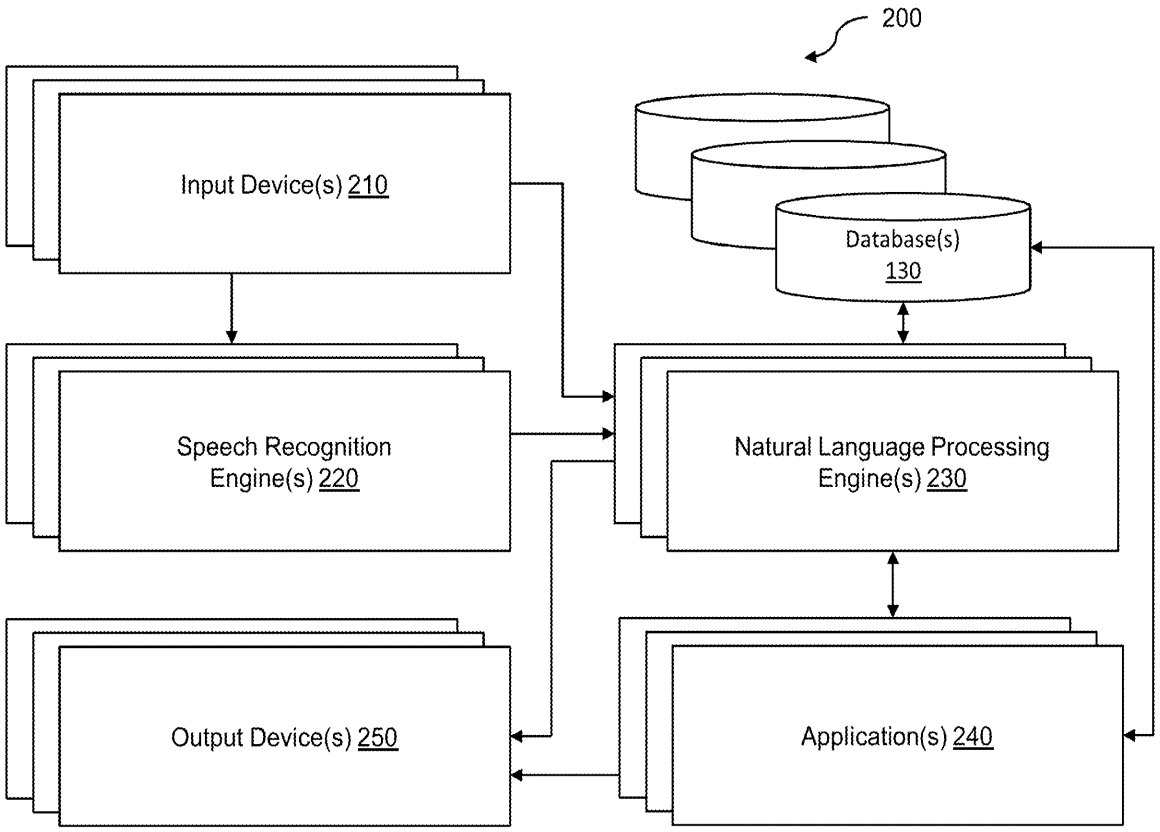

200
Input Device(s) 210
Database(s) 130
Speech Recognition Engine(s) 220
Natural Language Processing Engine(s) 230
Output Device(s) 250
Application(s) 240

FIG. 2

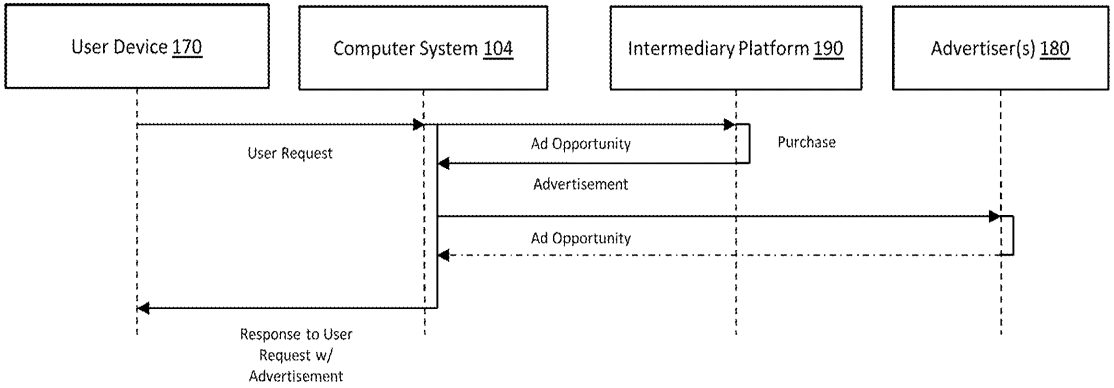

User Device 170
Computer System 104
Intermediary Platform 190
Advertiser(s) 180
User Request
Ad Opportunity
Purchase
Advertisement
Ad Opportunity
Response to User Request w/ Advertisement

FIG. 3

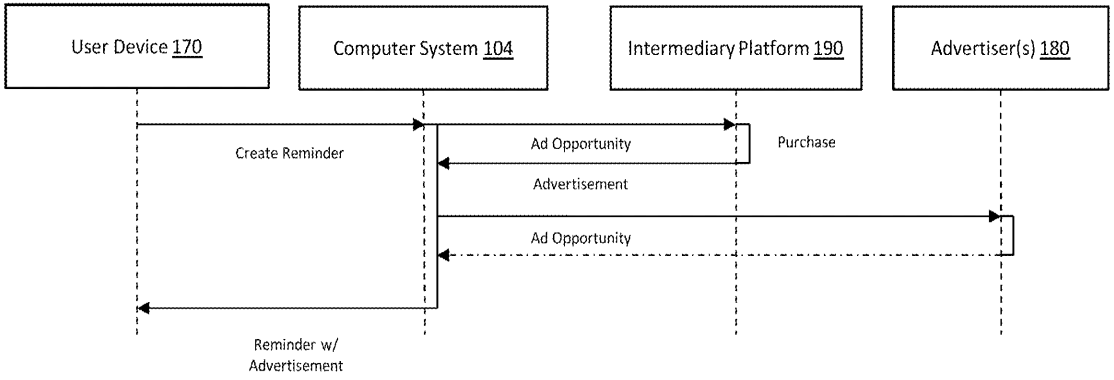

User Device 170
Computer System 104
Intermediary Platform 190
Advertiser(s) 180
Create Reminder
Ad Opportunity
Purchase
Advertisement
Ad Opportunity
Reminder w/ Advertisement

FIG. 4

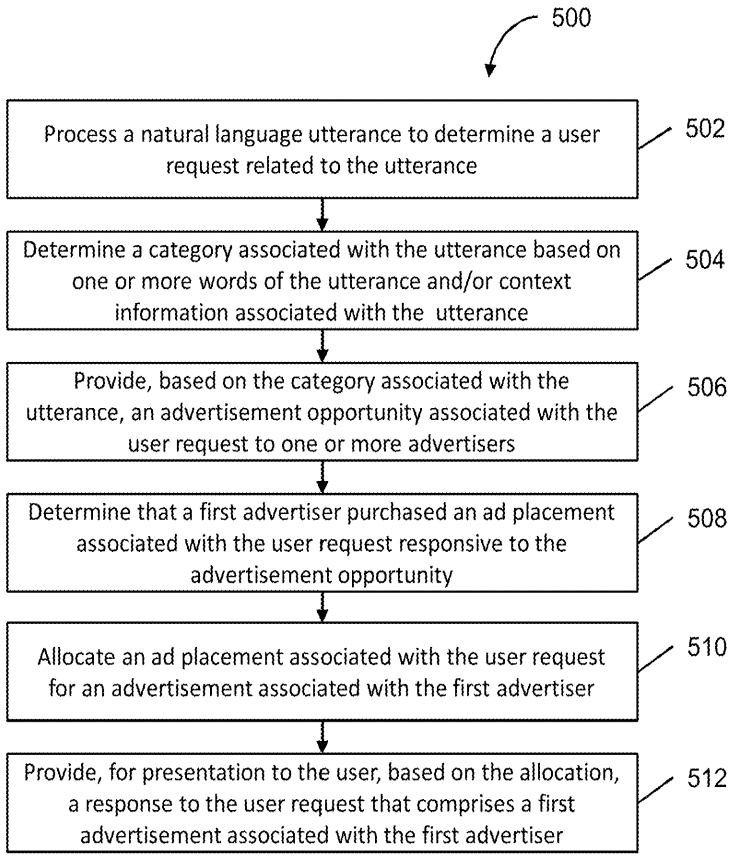

500
Process a natural language utterance to determine a user request related to the utterance
502
Determine a category associated with the utterance based on one or more words of the utterance and/or context information associated with the utterance
504
Provide, based on the category associated with the utterance, an advertisement opportunity associated with the user request to one or more advertisers
506
Determine that a first advertiser purchased an ad placement associated with the user request responsive to the advertisement opportunity
508
Allocate an ad placement associated with the user request for an advertisement associated with the first advertiser
510
Provide, for presentation to the user, based on the allocation, a response to the user request that comprises a first advertisement associated with the first advertiser
512

FIG. 5

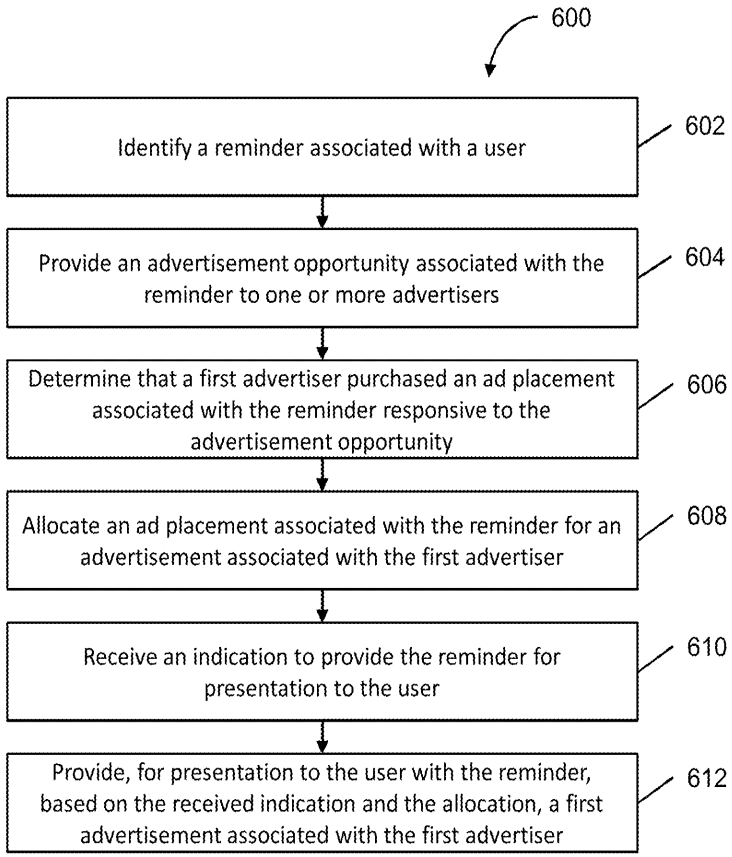


FIG. 6

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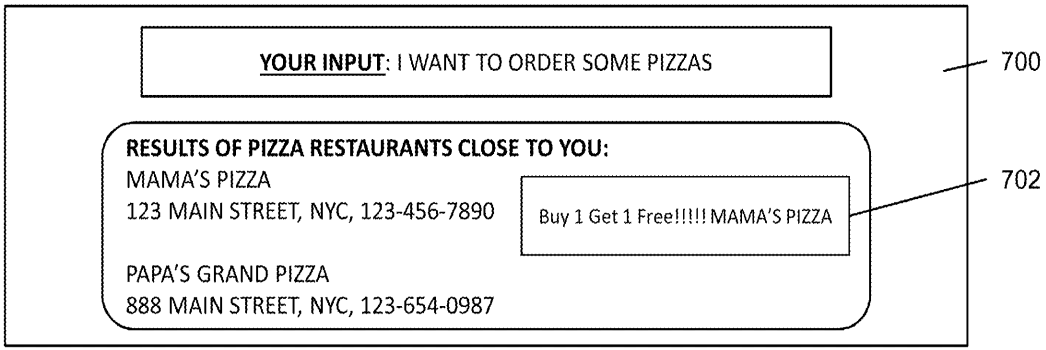


FIG. 7

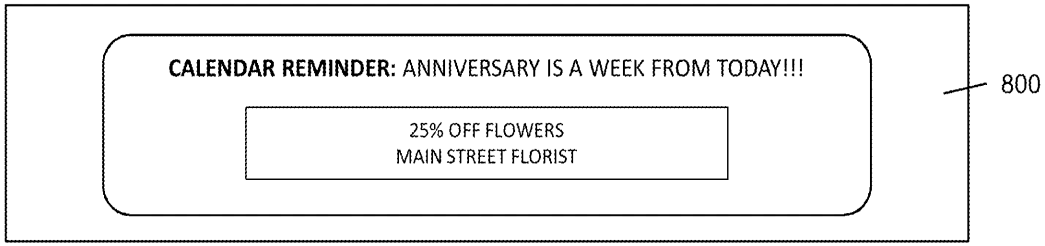


FIG. 8

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US15/50261

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06Q30/02, G06Q30/06, H04W4/02 (2015.01)
CPC - G06Q30/0255, G06Q30/0256, G06Q30/0267
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) Classifications: G06Q30/02, G06Q30/06, H04W4/02 (2015.01)
CPC Classifications: G06Q30/0251, G06Q30/0255, G06Q30/0256, G06Q30/0267

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatSeer (US, EP, WO, JP, DE, GB, CN, FR, KR, ES, AU, IN, CA, Other Countries (INPADOC), RU, AT, CH, TH, BR, PH), ProQuest, Google/Google Scholar, IP.com; ad, ads, advertisement, place, placing, host, post, display, user, request, speak, spoken, associate, correlate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X – Y	US 8503995 B2 (JUMPTAP, INC.) 06 August 2013; abstract; figures 1, 21; column 4, lines 52-54; column 11, lines 29-42; column 37, lines 4-18; column 77, lines 11-15; column 96, lines 8-10, 34-39; column 176, lines 52-57; column 177, lines 14-37, 48-67	1, 5-8, 10, 11, 15-18, 20 2-4, 9, 12-14, 19
Y	US 7697673 B2 (CHIU L et al.) 13 April 2010; column 4, lines 63-67; column 5, lines 1-7; column 14, lines 19-36; column 19, lines 50-55	2-4, 12-14
Y	US 2009/0024476 A1 (BAAR D et al.) 22 January 2009; figure 2; paragraph [0027]	9, 19

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Shane Thomas PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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(72) Inventor; and
(71) Applicant : **TANG, Min** [CN/US]; 12196 Ne 24th Street, Bellevue, WA 98005 (US).

(74) Agents: **KOO, Hean L.** et al.; Sheppard Mullin Richter & Hampton LLP, 2099 Pennsylvania Avenue, N.W., Suite 100, Washington, DC 20006 (US).

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[Continued on next page]

(54) Title: INTEGRATION OF DOMAIN INFORMATION INTO STATE TRANSITIONS OF A FINITE STATE TRANSDUCER FOR NATURAL LANGUAGE PROCESSING

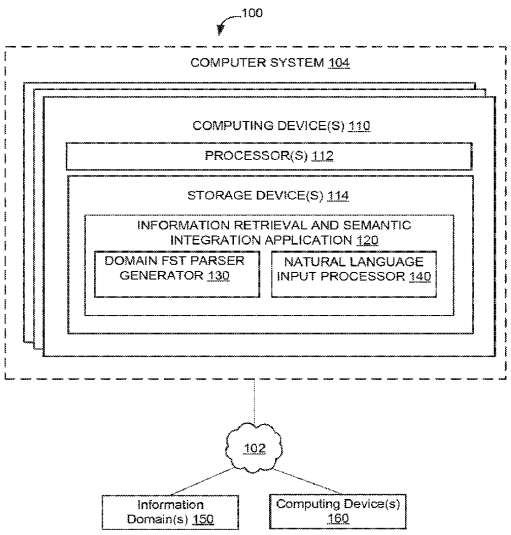


FIG. 1

(57) Abstract: The invention relates to a system and method for integrating domain information into state transitions of a Finite State Transducer ("FST") for natural language processing. A system may integrate semantic parsing and information retrieval from an information domain to generate an FST parser that represents the information domain. The FST parser may include a plurality of FST paths, at least one of which may be used to generate a meaning representation from a natural language input. As such, the system may perform domain-based semantic parsing of a natural language input, generating more robust meaning representations using domain information. The system may be applied to a wide range of natural language applications that use natural language input from a user such as, for example, natural language interfaces to computing systems, communication with robots in natural language, personalized digital assistants, question-answer query systems, and/or other natural language processing applications.

WO 2016/044321 A1

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

INTEGRATION OF DOMAIN INFORMATION INTO STATE TRANSITIONS OF A FINITE STATE TRANSDUCER FOR NATURAL LANGUAGE PROCESSING

CROSS REFERENCE TO RELATED APPLICATION

[001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 62/051,292 filed September 16, 2014 entitled "INTEGRATION OF DOMAIN INFORMATION INTO STATE TRANSITIONS OF A FINITE STATE TRANSDUCER FOR NATURAL LANGUAGE PROCESSING", the entirety of which is incorporated herein by reference.

FIELD OF THE INVENTION

[002] The invention relates to systems and methods of integrating domain information into state transitions of a Finite State Transducer for natural language processing.

BACKGROUND OF THE INVENTION

[003] Semantic parsing is a process that transforms natural language (NL) input (e.g., sentences, phrases, words, etc.) into computer executable complete meaning representations (MRs) for domain-specific applications, where Meaning Representation Language (MRL) for an application is assumed to be present. Part of the job of semantic parsing is to extract the domain information from a natural language input. For example, if a user queries "find Dixie's Grill," a semantic parser should be able to determine that the user is looking for a restaurant named "Dixie's BBQ."

[004] Semantic parsing is a difficult computational problem. One reason for this is that NL inputs and their meanings may have many-to-many relationships. For example, multiple NL inputs may correspond to a single meaning, a single input could have different meanings (usually users intend to convey a single meaning, so system would need to interact with/learn from the user to disambiguate them), and other many-to-many relationships can occur. Conventional semantic parsers typically are inefficient at disambiguating a potential meaning

of an NL input, particularly when the criteria size is large. Furthermore, conventional semantic parsers typically have sub-optimal matching capabilities. As a result, conventional semantic parsers do not scale well for complicated information domains and often produce inaccurate MRs.

[005] Other types of information retrieval systems may scale better than some semantic parsers. For example, conventional Inverted-Index-Search ("IIS") information retrieval systems, which are premised on keyword search, typically employ indexed information domains to facilitate efficient search. However, these systems typically ignore structural information (e.g., semantic structural information) that may be included in an NL input and therefore may not account for a user's intent. For example, for an NL input "find bus stop near VOICEBOX," the results from a conventional IIS information retrieval system may relate to documents (e.g., webpages) that contain the keywords in the search input, without semantic information to help determine the intent of the user. Thus, the results may be irrelevant to the user's intended request.

[006] Thus, what is needed is to improve semantic parsing for enhanced user intent recognition, improve the relevancy of information retrieval results, and improve recognition of NL, whether uttered, typed, or otherwise provided by a user. These and other problems exist.

SUMMARY OF THE INVENTION

[007] The invention addressing these and other drawbacks relates to systems and methods of integrating domain information into state transitions of a Finite State Transducer ("FST") for natural language processing. A system may integrate semantic parsing and information retrieval from an information domain to generate an FST parser that represents the information domain. The FST parser may include a plurality of FST paths, at least one of which may be used to generate a meaning representation from a natural language input (e.g., a natural language string based on a natural language utterance or other input). As such, the system may perform domain-based semantic parsing of a natural language input to generate robust meaning representations (e.g., search queries, commands, etc.) using domain information. By generating more relevant meaning representations, results obtained by executing the meaning representations may be more accurately aligned with the user's intent.

[008] The system may be applied to a wide range of natural language applications that use natural language input from a user. For example, and without limitation, applications of domain-based semantic parsing may include natural language interfaces to computing systems, communication with robots in natural language, personalized digital assistants, question-answer query systems, and/or other natural language processing applications.

[009] To generate an FST parser, the system may obtain a semantic grammar and then structure a given FST path based on the semantic grammar. An FST path may therefore have a semantic structure based on the semantic grammar. The semantic grammar may include various criteria. For example, a semantic grammar "find <business names>" includes an action criterion ("find") and a subject criterion ("<business names>"). Other semantic grammars having additional and/or different criteria may be used as well.

[010] An FST path may include a plurality of states, where at least two states are separated by a state transition. An initial state transition may be associated with an action criterion such as "find." The system may add subsequent state transitions to an FST path based on an information domain. For example, subsequent state transitions may be associated with a token (e.g., word) that appears in an entry of an information domain. For an FST parser that represents an information domain related to businesses, a state transition from one state to another state may be associated with a token (e.g., word) that is part of a business name. Other tokens in the business name may be associated with other state transitions, thus growing the FST path.

[011] For example, an entry "Burnstead Construction Inc." may include tokens "Burnstead," "Construction," and "Inc." Each token may be associated with a state transition. For example, the token "Burnstead" may yield an FST path corresponding to "find Burnstead." Other tokens of the entry may be used as well, either to add to the existing FST path or create a new FST path. For instance, another token "Construction" may result in an FST path corresponding to "find Burnstead Construction." The system may generate an FST path that includes some or all tokens in a given entry, and may generate one or more FST paths for each entry of an information domain. The system may also generate different FST paths for different permutations of an entry in an information domain. For example, one FST path may correspond to "find Construction Burnstead Inc." while another FST path may correspond to

"find Burnstead Construction Inc." Still other FST paths may omit certain tokens. For example, such an FST path may correspond to "find Burnstead Inc." The system may repeat these operations until all entries in the information domain are similarly processed into respective FST paths. The FST parser may therefore be representative of an information domain.

[012] The system may associate a token appearing in an information domain with a weight based on its frequency of appearance in the information domain and/or other domains. For example, the system may associate a weight with a token in proportion to a frequency of the token's appearance in an information domain. In a particular example, the token "Construction" may be weighted differently (e.g., less or more depending on the weighting system) than "Burnstead" if "Construction" appears in various business names but "Burnstead" appears only in one business name. As such, a state transition associated with a token may be weighted accordingly.

[013] The system may score an FST path based on cumulative weights associated with its state transitions. For example, the system may score an FST path by summing the weights associated with state transitions in the FST path. The system may use the score to determine whether a given FST path should be used to generate a meaning representation for a given natural language input. For example, the system may use the FST parser to determine a best FST path (or n-best FST paths) by identifying an FST path that is: (1) associated with tokens that have (exact or fuzzy) matches to tokens of a natural language input, and (2) has the highest (or lowest, depending on the scoring system) score. For instance, if tokens of a natural language input match tokens associated with two or more FST paths, then the FST path having the highest score (or n-highest scores) will be selected. In this manner, a semantic grammar (which is used to structure FST paths of a FST parser) integrated with information retrieval from an information domain (which may be used to weight tokens associated with state transitions of FST paths) may be used to generate more robust, relevant meaning representations.

[014] Once an information domain FST parser has been generated, it may be used to compose an input string FST used to generate a meaning representation from a natural language input. In the example that follows, the natural language input "Coffee find Seattle

Best Starbucks Coffee" will be used, although other types of queries/commands/input may be used as well. For example, the system may initialize (e.g., structure) an input FST using the natural language input. The system may compose the input FST based on an information domain FST parser.

[015] The system may find the shortest path (or n-best shortest paths) in the composed input FST, remove redundant epsilon arcs (if any), topologically order the arcs, and generate a parsing result based on the topsorted arcs. Based on the parsing result, an action such as "find" will be mapped its semantic meaning (e.g., "[Action:find]" and the criterion (e.g, "Seattle Best Starbucks Coffee") will be mapped to an entry in an information domain corresponding to businesses, such as "[BusinessName:Best Starbucks Coffee WA]." The system may generate the query string based on the criteria content, i.e., the string between "[" and "]", which is "Best Starbucks Coffee."

[016] In an implementation, the system may compose the input FST with an Information Extraction FST that is used to ignore irrelevant words in the natural language input, add additional words that may relate to the natural language input but were not included in the input, and/or otherwise modify the input FST based on known information. In this manner, the natural language input may be augmented with relevant information (or stripped of irrelevant noise) so that the resulting meaning representation, when executed, causes more relevant results to be returned.

[017] In an implementation, the system may process the input FST to account for phoneme errors. For example, the system may use a phoneme confusion matrix that is trained from speech data to further refine the natural language input to result in a more robust meaning representation that accounts for similar-sounding or otherwise indistinguishable words.

[018] In an implementation, the system may integrate dynamic data, such as information from a personal phonebook, by generating a dynamic data FST based on the dynamic data and insert the dynamic data FST into a dynamic slot of a domain information FST parser. In this manner, dynamic data may be integrated into semantic parsing to generate a meaning representation based on both domain information and dynamic data.

[019] When the input FST is composed (regardless of whether an information extraction FST, a phoneme confusion matrix, or dynamic data is used), the system may find the shortest path

(or n-best shortest paths) from the input FST, remove redundant epsilon arcs (if any), and topsort the arcs. The system may calculate the ID of the best-matched path corresponding to an entry in the information domain based on the sum of the weights along the input FST and generate a meaning representation based on the best-matched path.

[020] Accordingly, the system may generate a meaning representation from a natural language input by using tokens that appear in the natural language input (also referred to herein as input tokens) to select a relevant FST path (which was formed using a semantic grammar and tokens that appear in an information domain (also referred to herein an domain tokens to distinguish from input tokens)). The meaning representation may then be used to extract information from and/or execute a command on an appropriate information domain. In this manner, the system may efficiently generate more robust meaning representations that may lead to more accurate, less error-prone, results.

[021] These and other objects, features, and characteristics of the system and/or method disclosed herein, as well as the methods of operation and functions of the related elements of structure and the combination of parts and economies of manufacture, will become more apparent upon consideration of the following description and the appended claims with reference to the accompanying drawings, all of which form a part of this specification, wherein like reference numerals designate corresponding parts in the various figures. It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention. As used in the specification and in the claims, the singular form of "a", "an", and "the" include plural referents unless the context clearly dictates otherwise.

BRIEF DESCRIPTION OF THE DRAWINGS

[022] FIG. 1 illustrates a system of integrating domain information into state transitions of a Finite State Transducer for natural language processing, according to an implementation of the invention.

[023] FIG. 2 which depicts a process of generating an FST parser, according to an implementation of the invention.

[024] FIG. 3 depicts an FST path structured by a semantic grammar, according to an

implementation of the invention.

[025] FIG. 4 depicts a process of integrating information from an information domain to generate semantically structured FST paths based on tokens from the information domain, according to an implementation of the invention.

[026] FIG. 5 depicts an FST parser structured by a semantic grammar and expanded using information and weights from an information domain, according to an implementation of the invention.

[027] FIG. 6 schematically depicts an optimized version of the FST parser illustrated in FIG. 5, according to an implementation of the invention.

[028] FIG. 7 depicts a process of composing a meaning representation from a natural language input using an FST parser, according to an implementation of the invention.

[029] FIG. 8 depicts an input string FST that is initialized, according to an implementation of the invention.

[030] FIG. 9 depicts an input string FST that is composed using a domain information FST parser, according to an implementation of the invention.

[031] FIG. 10 depicts a 1-best FST selected using the input string FST, according to an implementation of the invention.

[032] FIG. 11 depicts an input FST composed with an information extraction FST, according to an implementation of the invention.

[033] FIG. 12 depicts a process of generating a domain information extraction FST, according to an implementation of the invention.

[034] FIG. 13 depicts an FST that expands every possible FST path at the terminal level, according to an implementation.

[035] FIG. 14 depicts a process of using wildcards to process a natural language input having variable text, according to an implementation of the invention.

[036] FIG. 15 illustrates an input FST generated for an input string in which state transitions and a temporary symbol table are generated, according to an implementation of the invention.

[037] FIG. 16 illustrates an example of an input string FST composed with an FST parser, according to an implementation of the invention.

[038] FIG. 17 depicts a modified and expanded input string FST, according to an implementation of the invention.

[039] FIG. 18 depicts a recreated input string FST, according to an implementation of the invention.

[040] FIG. 19 depicts an input string FST composed from a recreated input string FST and a modified and expanded input string FST, according to an implementation of the invention.

[041] FIG. 20A depicts a dynamic data FST using an exact match, according to an implementation of the invention.

[042] FIG. 20B depicts a dynamic data FST using fuzzy matching, according to an implementation of the invention.

[043] FIG. 21A depicts an FST parser in which a dynamic slot is filled with a dynamic data FST, which uses exact matching, according to an implementation of the invention.

[044] FIG. 21B depicts an FST parser in which a dynamic slot is filled with dynamic data FST, which uses fuzzy matching, according to an implementation of the invention.

[045] FIG. 22 depicts an FST having two phonemes and allowing up to two errors (including insertions, deletions, and replacements), with a penalty of 100 corresponding to each error, according to an implementation of the invention.

[046] FIG. 23 depicts a flow diagram of FST parsing at the phoneme level, according to an implementation of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[047] FIG. 1 illustrates a system 100 of integrating domain information into state transitions of a Finite State Transducer for natural language processing, according to an implementation of the invention. A system may integrate semantic parsing and information retrieval from an information domain to generate an FST parser that represents the information domain. The FST parser may include a plurality of FST paths, at least one of which may be used to generate a meaning representation from a natural language input (e.g., natural language utterance and/or other natural language input).

[048] The meaning representation may be used to execute an action (e.g., a search, a command, and/or other action) related to an information domain. As such, in an

implementation, the meaning representation is not necessarily a search result itself, but rather a semantically parsed translation of a natural language input that uses domain information to help understand the intent of the natural language input. Thus, the system may receive a user request in the form of a natural language input from a user (which may or may not have been recognized from an utterance), generate a meaning representation as described herein, and execute the meaning representation responsive to the user's request.

[049] Examples of an FST parser are used herein throughout for illustration and not limitation. The principles of integrating semantic parsing and information retrieval may be applied to other semantic parsing systems and other contexts as well. For example, more generically: [describe claim 1].

[050] Other uses of system 100 are described herein and still others will be apparent to those having skill in the art. Having described a high level overview of some of the system functions, attention will now be turned to various system components that facilitate these and other functions.

[051] System 100 may include a computer system 104, one or more information domains 150, one or more computing device(s) 160, and/or other components.

[052] Information Domains

[053] An information domain 150 may include a set of information that includes subject matter that may be searched or otherwise executed on. For example, an information domain 150 may include a listing of businesses, a listing of addresses, a listing of songs, a listing of personal contacts, and/or other corpus of information that may be searched, played or otherwise executed. Each information domain 150 may have its own type of information. For example, one information domain 150 may relate to businesses while another information domain 150 may relate to songs. In an implementation, an information domain 150 may include a combination of different types of information. For example, one information domain 150 may relate to businesses and songs.

[054] An information item in an information domain 150 may be associated with a token or keyword. For example, a listing of businesses may include the name of a business and/or other business-related information. A listing of songs may include a song title, artist name, genre, and/or other song-related information. An information domain 150 may be indexed to

facilitate rapid searching of its content, such as its tokens.

[055] Computer system 104

[056] Computer system 104 may include one or more computing devices 110. Each computing device 110 may include one or more processors 112, one or more storage devices 114, and/or other components. Processor(s) 112 may be programmed by one or more computer program instructions, which may be stored in storage device(s) 114.

[057] The one or more computer program instructions may include, without limitation, an information retrieval and semantic integration application 120 ("IRSI application 120"). IRSI application 120 may itself include different sets of instructions that each program the processor(s) 112 (and therefore computer system 104). For example, IRSI application 120 may include a domain FST parser generator 130, a natural language input processor 140, and/or other instructions that program computer system 104. As used herein, for convenience, the various instructions will be described as performing an operation, when, in fact, the various instructions program computer system 104 to perform the operation.

[058] Generating an FST Parser Representative of an Information Domain

[059] Domain FST parser generator 130 may generate an FST parser that integrates information retrieval from an information domain 150 and a semantic grammar. For example, FIG. 2 depicts a process 200 of generating an FST parser, according to an implementation of the invention. The various processing operations and/or data flows depicted in FIG. 2 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[060] Structuring FST paths of an FST Parser using a semantic grammar

[061] In an operation 202, FST parser generator 130 (or other instructions) may obtain a semantic grammar and structure an FST path based on the semantic grammar. An FST path may include a plurality of states, where at least two states are separated by a state transition.

A semantic grammar may include at least an action criterion and a subject criterion. For example, a semantic grammar "find <BusinessNames>" includes an action criterion ("find") and a subject criterion ("<BusinessNames>"), in which an initial state is depicted using bold and a final state is depicted with double circles. Other semantic grammars having additional and/or different criteria may be used as well.

[062] FST parser generator 130 may structure an FST path using the criteria of the semantic grammar to form state transitions from one state to another state such that each criterion is represented as a node in the FST path. For example, FIG. 3 depicts an FST path 300 structured by a semantic grammar (in the illustrated example: "find <BusinessNames>"), according to an implementation of the invention. A given state (or node 0, 1, 2, 3, 4 as illustrated in FIG. 3) may be transitioned to another state via a state transition, which is illustrated by an arrow (also described herein as an "arc," which may be labeled).

[063] Integrating domain information into semantically structured FST paths of an FST Parser

[064] In an operation 204, FST parser generator 130 may integrate information from an information domain 150 to generate semantically structured FST paths based on tokens (e.g., words) from the information domain. For example, FST parser generator 130 may add state transitions to a semantically structured FST path based on tokens from an information domain. Subsequent state transitions may be associated with a token that appears in an entry of an information domain 150.

[065] Table 1 illustrates non-limiting examples of entries in an information domain related to businesses. Such an information domain will typically have many more entries (e.g., an entry for each known business), but the illustrated information domain is illustrated with five entries for illustrative purposes. Furthermore, an information domain may include alternative or additional types of information. The following table is therefore included solely to illustrate aspects of the disclosure and will be described in conjunction with FIGS. 4, 5, and 6 that follow.

entry weight	*Entry Full Name*
3	Best Starbucks Coffee WA
1	Burnstead Construction Inc WA
1	Microsoft WA
1	Seattle Best Coffee WA
1	VoiceBox Technologies Inc WA

[066] For an FST parser representing an information domain illustrated in Table 1, a state transition from one state to another state may be associated with a token that is part of a business name. Other tokens in the business name may be associated with other state transitions, thus growing an FST path that corresponds to an entry in the information domain.

[067] For example, an entry "Burnstead Construction Inc." may include tokens "Burnstead," "Construction," and "Inc." Each token may be associated with a state transition. The token "Burnstead" may yield an FST path corresponding to "find Burnstead." Other tokens of the entry may be used as well, either to add to the existing FST path or create a new FST path. For instance, another token "Construction" may yield an FST path corresponding to "find Burnstead Construction." The system may generate an FST path that includes some or all tokens in a given entry, and may generate one or more FST paths for each entry of an information domain. The system may also generate different FST paths for different permutations of an entry in an information domain. For example, one FST path may correspond to "find Construction Burnstead Inc." while another FST path may correspond to "find Burnstead Construction Inc." The system may repeat these operations until all entries in the information domain are similarly processed into respective FST paths. The FST parser may therefore be representative of an information domain 150.

[068] FST parser generator 130 may associate a token appearing in an information domain with a weight based on its frequency of appearance in the information domain and/or other domains. For example, FST parser generator 130 may associate a weight with a token in proportion to a frequency of the token's appearance in an information domain. In a particular example, the token "Construction" may be weighted differently (e.g., less or more depending on the weighting system) than "Burnstead" if "Construction" appears in various business

names but "Burnstead" appears only in one business name.

[069] The token weight may serve to indicate which tokens may be more relevant than others when matching input tokens from an input request (e.g., a user search request) with tokens from an FST path (e.g., so that the relevance of a given FST path to the input tokens may be determined). For example, an FST path having matching tokens that commonly appear in an information domain may be less relevant to an input request than an FST path having matching token that do not commonly appear in the information domain.

[070] FST parser generator 130 may score an FST path based on cumulative weights associated with its state transitions. For example, the system may score an FST path by summing the weights associated with state transitions in the FST path. FST parser generator 130 may use the score to determine a relevance of a given FST path to a given natural language input. For example, the system may use the FST parser to determine a best FST path (or n-best FST paths) by identifying an FST path that is: (1) associated with tokens that have (exact or fuzzy) matches to tokens of a natural language input, and (2) has the highest (or lowest, depending on the scoring system) score. For instance, if tokens of a natural language input match tokens associated with two or more FST paths, then the FST path having the highest score (or n-highest scores) will be selected. In this manner, a semantic grammar (which is used to structure FST paths of a FST parser) integrated with information retrieval from an information domain (which may be used to weight tokens associated with state transitions of FST paths) may be used to generate more robust, relevant meaning representations.

[071] FIG. 4 depicts a process 400 of integrating information from an information domain 150 to generate semantically structured FST paths based on tokens from the information domain, according to an implementation of the invention. Operation 204 illustrated in FIG. 2 may use some or all of the processing operations of process 400 to integrate information from an information domain 150.

[072] In an operation 402, domain FST parser generator 130 may obtain a criteria list, which may include entries in an information domain. For example, domain FST parser generator 130 may obtain the business name entries in the exemplary information domain illustrated in Table 1.

[073] In an operation 404, domain FST parser generator 130 may determine a weight, such as a term frequency inverse document frequency value ("TF-IDF") value, for each token in the criteria list. For example, domain FST parser generator 130 may determine a TF-IDF value for each token that appears in the criteria list, whether in a single entry or multiple entries. As would be appreciated, a more common token (e.g., one that occurs more than another token) may be associated with a lower TF-IDF value while a less common token may be associated with a higher TF-IDF value.

[074] In an operation 406, domain FST parser generator 130 may obtain and process a next entry in the criteria list. For example, once tokens for each entry of an information domain have been assigned a TF-IDF value depending on their appearance in the information domain, domain FST parser generator 130 may iteratively obtain and process a next business name in the information domain.

[075] In an operation 408, domain FST parser generator 130 may obtain a list weight for a given entry (if any). For example, a given business name entry may be weighted more or less heavily than another business name entry.

[076] In an operation 410, domain FST parser generator 130 may determine a token weight for each token in an entry. The token weight may include a TF-IDF value of the token and may be adjusted based on the list weight (if any) for an entry in which the token appears.

[077] In an implementation, each token in each list may have a different weight. For example, a TF-IDF value may be calculated for each token using equation (1):

$$\text{TF-IDF} = \frac{number\ of\ occurances\ of\ i\ in\ list\ j}{document\ length\ of\ list\ j} * \log \frac{Total\ number\ of\ lists}{number\ of\ lists\ that\ contain\ token\ i} \quad (1),$$

wherein:

$list_j$ corresponds to an entry in an information domain (also referred to herein as list $entry_j$);

i = a given token;

document length of list j = $\sqrt[3]{number\ of\ words}$;

[078] In an implementation, F_{1j} (the closeness of the candidate i for list entry$_j$) may be calculated using equation (2):

$$F_{ij}= C_1 * (\#\ of\ matched\ tokens) + C_2 * \sum_{each\ \text{token}\ x\ \text{in List Entry i}} TFIDF(x, j) + C_3 * (word\ \ position\ metrics) + C_4 * Weight_j \quad (2),$$

wherein:

C_1, C_2, C_3, C_4 are pre-defined weights; Weight$_j$ is the priori-likelihood for *j* (e.g., "Starbucks" may be given more weight than "Dixie's BBQ"); and

C_3 is *0*.

[079] According to equation (2), a higher closeness value indicates a better candidate. Referring to equation (2), "word position metrics" refers to a level of closeness of candidate i to list entry j in terms of word order/position.

[080] In the non-limiting example that follows, the "word position metrics" between "i" and "k" should be 1, because it is an exact match. The "word position metrics" between "i" and "j" should be 0.8, because one word ("wa") is not in the same order between Candidate I and List entry j:

Candidate i : "burnstead construction inc. wa"

List entry j: "wa burnstead construction inc."

List entry k: "burnstead construction inc. wa"

[081] In an implementation, to yield the lowest (positive) value for the best candidate, F_{1j} (the closeness of the candidate *j* for token *i* for which the lowest value indicates the best candidate) may be calculated using equation (3):

$$F_{2j}= C_1 * (\#\ of\ not\ matched\ tokens) + C_2 * \sum (TFIDF_{\max} - tfidf_{ij}) + C_4 * (Weight_{\max} - Weight_j) \quad (3),$$

wherein:

$TFIDF_{max}$ = the maximum value of all TFIDF values for all tokens in all list entries; and

$Weight_{max}$ = the maximum value of all TFIDF values for all tokens in all list entries.

[082] Assuming N is the total number of words in the query string, then:

$$F_{2j} = \begin{aligned} & C_1 * (N - \#\ of\ not\ matched\ tokens) + C_2 * \sum TFIDF_{\max} - C_2 * \sum tfidf_{ij} \\ & + C_4 * Weight_{\max} - C_4 * Weight_j \end{aligned}$$

$$= \begin{aligned} & C_1 * N + C_2 * \sum TFIDF_{\max} + C_4 * Weight_{\max} \\ & - C_1 * (\#\ of\ not\ matched\ tokens) - C_2 * \sum tfidf_{ij} - C_4 * Weight_j \end{aligned}$$

$$= C_1 * N + C_2 * \sum TFIDF_{\max} + C_4 * Weight_{\max} - F_{1j} \quad (4).$$

wherein:

$TFIDF_{max}$ is the maximum value of all TFIDF values for all tokens in all list entries;

Weightmax is the maximum value of all weights for all list entries; and

Weightj is the weight for list entry j.

[083] In an implementation, the token weight may be further weighted based on a list weight (if any) associated with the entry.

[084] In an operation 412, domain FST parser generator 130 may create an arc from the start point (e.g., a command state or node) to each token such that a state transition from the start point to a given token node (e.g., state associated with a token) is associated with the token weight.

[085] In an operation 414, domain FST parser generator 130 may create another arc from a previous token node (if it exists) to the current token node such that a state transition from the previous token node to the current token node is associated with the token weight.

[086] In an operation 416, domain FST parser generator 130 may mark all token nodes as a final state.

[087] In an operation 418, domain FST parser generator 130 may determine whether more entries in the list are to be processed. If more entries are to be processed, domain FST parser generator may return to operation 406. Otherwise, FST parser generator 130 may complete generation of the FST parser in an operation 420.

[088] FIG. 5 schematically depicts an FST parser 500 structured by a semantic grammar and expanded using information and weights from an information domain, according to an implementation of the invention. FST parser 500 schematically depicts results from the processing operations of process 400 using the information domain illustrated in Table 1. FST parser 500 may include a plurality of nodes (0-21). A given node (0-21) may be associated

with a token, an arc, and/or an end point. Each node (0-21) may be part of an FST path.

[089] Optimizing an FST parser

[090] Returning to FIG. 2, in an operation 206, domain FST parser generator 130 may optimize the FST parser generated from operation 204 (additional details of which were described with respect to process 400 in FIG. 4).

[091] For example, domain FST parser generator 130 may determinize an FST parser such that each state may have at most one transition with any given input label and empty labels are eliminated. The resulting FST may contain at most one patch matching any given input string, therefore reducing the time and space needed to process the string. Conditions of a determinizable FST include, for example, weakly left divisible semirings, a determinization algorithm can finish on M, all unweighted acceptors are determinizable, all acyclic acceptors are determinizable, not all weighted acceptors or transducers are determinizable, and characterization based on the twins property.

[092] In an implementation, domain FST parser generator 130 may further reduce the size of an FST parser by applying minimization, saving space and processing time. In an implementation, domain FST parser generator 130 may further reduce the size of an FST parser by performing an arc sort, which sorts the arcs in an FST per state. FIG. 6 schematically depicts an optimized version 600 of the FST parser 500 illustrated in FIG. 5, according to an implementation of the invention. As illustrated, optimized version 600 includes only nodes 0-11, in which various nodes and arcs have been removed from FST parser 500 during an optimization process to generate optimized version 600.

[093] Composing a Meaning representation from a Natural Language Utterance using the FST Parser

[094] In an implementation, natural language input processor 140 may generate a meaning representation from a natural language input by selecting and applying an FST parser, which is generated by FST parser generator 130. The natural language input may include an input string. The input string may have been converted from a user utterance using conventional speech-to-text techniques or may have been input as text from the user. In any event, the natural language input may be processed to generate a meaning representation using an FST parser (e.g., an FST parser generated by domain FST parser generator 130).

[095] For example, FIG. 7 depicts a process 700 of composing a meaning representation from a natural language input using an FST parser, according to an implementation of the invention.

[096] In an implementation, in an operation 702, natural language input processor 140 may initialize (e.g., structure) an input string FST using the input string. For example, for each word in the query string, natural language input processor 140 may:

- add an arc from a current node (corresponding to a given word of the input string being processed) to a next node depending on whether the given word matches with a word from an information domain. For example, natural language input processor 140 may add one arc from a current node to a next node with an input label being the word ID, an output label being the word ID, and a weight being 0. This arc means there is no cost when the input word is matched. Natural language input processor 140 may add one arc from a current node to a next node with an input label being the word ID, an output label being epsilon, and a weight being C1. This arc means the cost will be C1 when the input word is not matched.
- add one self-loop arc to a current node with an input label being epsilon, an output label being left boundary, and a weight being 0. This arc means the left boundary could happen at any location of the input string without consuming any input label.
- add one self-loop arc to next node with input label being epsilon, output label being right boundary, and weight being 0. This arc means the right boundary could happen at any location of the input string without consuming any input label.

[097] For the last word of the input string, natural language input processor 140 may set the last node as the final state. FIG. 8 depicts an input string FST (having nodes 0-8) that is initialized according to operation 702 if the input query string is "Coffee find Seattle Best Starbucks Coffee," according to an implementation of the invention.

[098] In an operation 704, natural language input processor 140 may compose the input FST based on an information domain FST parser (e.g., an FST parser generated by domain FST parser generator 130). FIG. 9 depicts an input string FST 900 that is composed using a domain information FST parser, according to an implementation of the invention. Input string FST 900 is composed in operation 704 using, for example, a domain information FST parser that is

based on Table 1 (e.g., FST parser 500 or FST parser 600). For example, an output of the domain information FST parser may be used as in put to FST 900.

[099] In an operation 706, natural language input processor 140 may find the shortest path (or n-best shortest paths) in the composed input FST. FIG. 9 depicts an input string FST 900 (having nodes 0-24) that is composed using a domain information FST parser, according to an implementation of the invention. FIG. 10 depicts a 1-best FST 1000 (having nodes 0-8) selected using the input string FST, according to an implementation of the invention.

[0100] In an operation 708, natural language input processor 140 may remove redundant epsilon arcs (if any).

[0101] In an operation 710, natural language input processor 140 may topologically order (i.e., "topsort") the arcs.

[0102] In an operation 712, natural language input processor 140 may generate a parsing result based on the topsorted arcs. For example, for the following represent an input, parsing result, and weight:

[0103] Input: Coffee find Seattle Best Starbucks Coffee

[0104] Parsing Result: find [Best Starbucks Coffee]

[0105] Weight: 0 148.92 85.92 148.92

[0106] Based on the parsing result, "find" will be mapped its semantic meaning (e.g., "[Action:find]" the string "Seattle Best Starbucks Coffee" will be mapped to an entry in an information domain, such as "[BusinessName:Best Starbucks Coffee WA]" as it appears in Table 1.

[0107] In an operation 714, natural language input processor 140 may generate the query string based on the criteria content, i.e., the string between "[" and "]", which is "Best Starbucks Coffee."

[0108] In an operation 716, natural language input processor 140 may compose the input FST with the Information Extraction FST (the generation of which is illustrated with respect to FIG. 12). FIG. 11 depicts an input FST 1100 (having nodes 0-24) composed with an information extraction FST, according to an implementation of the invention.

[0109] In an operation 718, natural language input processor 140 may find the shortest path (or nbest shortest paths) from the input FST (e.g., input FST 1100).

[0110] In an operation 720, natural language input processor 140 may remove redundant epsilon arcs (if any) and topsort the arcs.

[0111] In an operation 722, natural language input processor 140 calculate the ID of the best-matched path corresponding to an entry in the information domain based on the sum of the weights along the FST. The query input may be generated based on the best-matched path. In some implementations, by selecting the best-matched path (and corresponding entry in the information domain), natural language input processor 140 may ignore words in the input string that may be irrelevant to the information domain while using words in the input string that are relevant to the information domain to formulate a meaning representation that, when used to obtain information from the information domain, will result in more relevant results.

[0112] Generating an Domain Information Extraction FST

[0113] In an implementation, natural language input processor 140 may generate a domain information extraction FST to obtain detailed information related to an input string. For example, a domain information extraction FST may be used to ignore irrelevant ("noise") words, add relevant words that are likely related to the input string but have not been included in the input string, and/or otherwise use domain information to fine tune an input string (such as by obtaining a full title of a song when only a portion of the song title is included in the input string).

[0114] In another example, the following illustrates an input, a parsed input without domain information extraction, and a parsed input with domain information extraction:

[0115] Input: find Cavanaugh Rd Normal Town Pennsylvania

[0116] After parser FST: find [Cavanaugh Rd Pennsylvania]

[0117] After Extraction FST: find [Cavanaugh Rd Normalville Pennsylvania]

[0118] In the foregoing example, input to the Extraction FST is "Cavanaugh Rd Pennsylvania", the output is "Cavanaugh Rd Normalville Pennsylvania," where the city name "Normalville" is added to fine tune the input.

[0119] In some implementations, natural language input processor 140 may extract (and add to an input) only the best matched information, instead of N-best matches. In other implementations, natural language input processor 140 may extract n-best matches using an

inverted-index-search approach.

[0120] FIG. 12 depicts a process 1200 of generating a domain information extraction FST, according to an implementation of the invention.

[0121] In an operation 1202, natural language input processor 140 may create an FST for the list, adding a last arc with a last arc indicator (e.g., "list_N," where "N" corresponds to a list entry number that is incremented with each list entry) for each entry in the list.

[0122] In an operation 1204, natural language input processor 140 may optimize the FST, such as by removing epsilons (if any), performing determinization, and/or other performing other optimizations.

[0123] In an operation 1206, natural language input processor 140 may remove the non-sense arcs from start state to end state directly. For each arc with input label being real words, natural language input processor 140 may remove its weights. For each arch with input label being list_N, for each pair of states, only keep only one outbound arc (leaving the state) which has the smallest weight or which has the smallest ID when they have the same weights, change the input label to <epsilon> and set the weight as the "N" (the number ID of the list).

[0124] In an operation 1208, natural language input processor 140 may optimize the FST by removing epsilons (if any), performing determinization, performing minimization, and/or performing other operations.

[0125] In an implementation, natural language input processor 140 may use the FST to return the numeric ID of a best matched list as the weight given an input string.

[0126] Grammar to FST Conversion

[0127] In an implementation, the system may apply an FST only once, generating an FST such that the FST expands every possible FST path at the terminal level. FIG. 13 depicts an FST 1300 (having nodes 0-9) that expands every possible FST path at the terminal level, according to an implementation of the invention. FST 1300, as illustrated, is constructed based on the following grammar:

public $Rule1 = word1 $Rule2 word2

protected $Rule2 = word3

[0128] In the illustrated example, in order to show the rule information in the parse result, the

system may create transitions such as "ε:rule_beginning" and "ε:rule_end".

[0129] Matching Variable Text Using Wildcards

[0130] A natural language input may include variable text that may include different words and meanings. In these instances, the system may need to process such variable text to understand how to generate an input query from the natural language input. The system may do so using wildcards. For example, in a natural language input that takes the form of "text $text_body to $person_name," the variable text $text_body and $person_name may include any word or words.

[0131] The system may introduce a wildcard (e.g., a special word "__vbt_wild_card__") that can match any word. For example, the foregoing example, with wildcard added, may be represented as:

public $Text=
text $text_body to $person_name;
protected $text_body=
__vbt_wild_card__ <1->;

protected $person_name=
__vbt_wild_card__ <1->;

[0132] In the description of FIGS. 14-19 that follows, the natural language input of "text lunch together to min tang" will be used by way of illustration and not limitation. FIG. 14 depicts a process 1400 of using wildcards to process a natural language input having variable text, according to an implementation of the invention.

[0133] In an operation 1402, an input string FST may be generated for an input string (e.g., a natural language input string). For each word in the input string, three state transitions may be generated: (1) W:W/0, (2) W:ε/C_1, and (3) W:*/C_1-C_2. A temporary symbol table may also be created, which stores the index of out-of-vocabulary words (e.g., words that do not appear in an information domain). In this case, it contains the following words "lunch", "together", "min" and "tang". In an implementation, the life cycle of the temporary symbol table is only one session. FIG. 15 illustrates an input FST 1500 (having nodes 0-6) generated for an input

string in which state transitions and a temporary symbol table are generated, according to an implementation of the invention. For example, input FST 1500 may be generated based on operation 1402.

[0134] In an operation 1404, the input FST may be composed with a FST parser (e.g., a FST parser generated by domain FST parser generator 130). In an implementation, project to output label may be performed, epsilons may be removed, and the shortest path may be found. FIG. 16 illustrates an example of an input string FST 1600 (having nodes 0-27) composed with an FST parser according to an implementation of the invention. For example, input string FST 1600 may be composed based on operation 1404.

[0135] In an operation 1406, input string FST 1600 may be modified and expanded. For example, for each transition:

- If the output label *w* is not a terminal, change transition from *w*:*w* to *0*:*w*;
- If the output label *w* is a terminal;
- If *w* is the wildcard symbol, expand it to multiple transitions;
- Otherwise keep the transition as *w*:*w*.

[0136] FIG. 17 depicts a modified and expanded input string FST 1700 (having nodes 0-27), according to an implementation of the invention. For example, modified and expanded input string FST 1700 may be generated based on operation 1406.

[0137] In an operation 1408, the input string FST may be recreated without wildcards (since such wildcards are accounted for in operation 1406). FIG. 18 depicts a recreated input string FST 1800 (having nodes 0-6), according to an implementation of the invention. For example, recreated input string FST 1800 may be generated based on operation 1408.

[0138] In an operation 1410, a final FST may be generated by composing recreated input string FST 1800 and modified and expanded input string FST 1700, performing project to output label, removing epsilons, and finding the shortest path. FIG. 19 depicts an input string FST 1900 (having nodes 0-27) composed (e.g., using output) from recreated input string FST 1800 and modified and expanded input string FST 1700, according to an implementation of the invention.

[0139] In an operation 1412, the parsing result may be output. For example, depth-first-search may be used to traverse the final FST.

[0140] For example, in XML format, the parsing result for the above may include:

NBest 1: (score = 3960000)

```
<text>
 <Text>
  text <text_body> lunch together </text_body> to <person_name> min tang </person_name>
 </Text>
</text>
```

NBest 2: (score = 3970000)

```
<text>
 <Text>
  text <text_body> lunch together </text_body> to <person_name> tang </person_name>
 </Text>
</text>
```

NBest 3: (score = 3970000)

```
<text>
 <Text>
  text <text_body> together </text_body> to <person_name> min tang </person_name>
 </Text>
</text>
```

[0141] In JSON format, the parsing result for the above may include:

NBest 1: (score = 3960000)

```
[{"Text":{"text_body":" lunch together ","person_name":" min tang "}}]
```

NBest 2: (score = 3970000)

```
[{"Text":{"text_body":" lunch together ","person_name":" tang "}}]
```

NBest 3: (score = 3970000)

```
[{"Text":{"text_body":" together ","person_name":" min tang "}}]
```

[0142] Other output formats may be used as well to represent and view parsing results. Furthermore, in an implementation, the wildcard could be also supported by using a customized matchers, such as a SigmaMatcher<M> function.

[0143] Dynamic Update

[0144] In an implementation, instead of matching a predefined information domain or using wildcards, users may wish to query dynamic data that regularly changes or is otherwise frequently updated. For example, dynamic data may include a phone book (e.g., personal contact lists), personal documents, and/or other information that may regularly change.

[0145] In an implementation, the use of dynamic data may be supported by defining a dynamic slot in the grammar. For example, a dynamic data FST may be generated based on dynamic data (similar to the manner in which FST parser generator 130 generates an FST parser). The dynamic data FST may be used to fill a dynamic slot in an FST parser.

[0146] Table 2 illustrates non-limiting examples of dynamic data entries in a phone book. Such dynamic data will typically have many more entries (e.g., an entry for each contact), but the illustrated dynamic data is illustrated with two entries for illustrative purposes. Furthermore, the dynamic data may include alternative or additional types of information. The following table is therefore included solely to illustrate aspects of the disclosure and will be described in conjunction with FIGS. 20A, 20B, 21A, and 21B that follow.

Phone_Book	Name	Weight
Person 1	min tang	1
Person 2	Obama	1

[0147] In an implementation, an exact match and/or a fuzzy match may be used when generating a dynamic data FST. FIG. 20A depicts a dynamic data FST 2000A (having nodes 0-2) using an exact match, according to an implementation of the invention. FIG. 20B depicts a dynamic data FST 2000B (having nodes 0-2) using fuzzy matching, according to an implementation of the invention.

[0148] In an implementation, a dynamic slot of an FST parser may be filled with dynamic data FST 2000A or dynamic data FST 2000B. FIG. 21A depicts an FST parser 2100A (having nodes 0-13) in which a dynamic slot is filled with dynamic data FST 2000A, which uses exact matching, according to an implementation of the invention. FIG. 21B depicts an FST parser 2100B

(having nodes 0-13) in which a dynamic slot is filled with dynamic data FST 2000B, which uses fuzzy matching, according to an implementation of the invention.

[0149] An example of an input and parsing output (in JSON format) based on use of dynamic updates using dynamic data includes:

input: text talk to me to min tang

output In JSON format:

NBest 1: (score = 2970100)

[{"Text":{"text_body":" talk to me ","person_name":" min tang "}}]

NBest 2: (score = 2980100)

[{"Text":{"text_body":" talk me ","person_name":" min tang "}}]

NBest 3: (score = 2980100)

[{"Text":{"text_body":" to me ","person_name":" min tang "}}]

[0150] Named Entity Extraction Support

[0151] In an implementation, FSTs generated herein may integrate character level information in order to help the system determine intent.

[0152] For example, for the input: "call (425)123-4567 please," a human being is able to figure out the intent to make a phone call to (425)123-4567. However, in order for a computer to recognize the intent, absent named entity information, wildcards may be required to create a pattern such as "call *". This is not an optimal solution, because the aggressive wildcard would capture noise, such as "please" in the foregoing input example. To avoid abusing the usage of wildcard, we apply Named Entity Extraction ("NER") process before parsing.

[0153] For example, assuming that the NER process returns the following NBest result:

NBest 1: call (425)123-4567

NBest 2: call <__vbtPN__> (425)123-4567 </__vbtPN__>

[0154] An input query FST may be created based on the above NBest result, and then parsed.

Using such processing, an output may include, for example:

NBest 1:

[{"CallByNumber":{"PhoneNumber":{"__vbtPN__":" (425)123-4567 "}}}]

[0155] Error Tolerance String Matching / Approximate String Matching

[0156] Errors in speech recognition may be caused by various error-introducing conditions. Such conditions may include, for example, homonyms, compound words, text normalization, and/or other issues that may cause errors in speech recognition. In the written language, for example, the strings "call (425)123-4567" and "call 4 2 5 1 2 3 4 5 6 7" are two different strings, but they share the same pronunciations (and could have different associated meanings or intent).

[0157] In an implementation, to help address the foregoing issues, the system may perform FST parsing at the phoneme level. By performing intent-recognition at the phoneme level, the system may handle sound-alike, homonym, compound-words, text normalization issues, and/or other error-introducing conditions. By injecting an error model (phonetic confusion matrix), the system may be able to make the parsing process robust to ASR errors (to some extent).

[0158] Table 3 illustrates a non-limiting example of a phoneme confusion matrix that is trained from speech data. In Table 3, ε stands for "null," which indicates that a corresponding phoneme is deleted or inserted; Pij is the penalty for phoneme i recognized as phoneme j, which case P_{ii} should be 0.

probability	ε	Phoneme 1	Phoneme 2	...	Phoneme i	...	Phoneme n
ε	P_{00}	P_{01}	P_{02}		P_{0i}		P_{0n}
Phoneme 1	P_{10}	P_{11}	P_{12}		P_{1i}		P_{1n}
Phoneme 2	P_{20}	P_{21}	P_{22}		P_{2i}		P_{2n}
...							
Phoneme i	P_{i0}	P_{i1}	P_{i2}		P_{ii}		P_{in}
...							

Phoneme n	P_{n0}	P_{n1}	P_{n2}		P_{ni}		P_{nn}

[0159] To allow any number of phonetic errors may be too computational demanding because. To restrict the size of possible candidates and limit the search space, the system may limit the number of allowed phonetic errors.

[0160] FIG. 22 depicts an FST 2200 (having nodes 0-2) having two phonemes and allowing up to two errors (including insertions, deletions, and replacements), with a penalty of 100 corresponding to each error, according to an implementation of the invention.

[0161] FIG. 23 depicts a flow diagram 2300 of FST parsing at the phoneme level, according to an implementation of the invention. In an implementation, a Phoneme Error Model 2302 may be generated using an input phoneme sequence/graph. Phoneme Error Model 2302 may include an FST that allows a given phoneme to transduce to another given phoneme, with a transition penalty (e.g., Pij defined in Table 3).

[0162] In an implementation, a Dictionary Model 2304 may be generated that includes an FST that defines each pronunciation of words in a given path. In an implementation, a Word-level Parser 2306 may be generated that includes an FST parser described herein, which is used to generate an output used for semantic queries.

[0163] Examples of System Architectures and Configurations

[0164] In an implementation, various system architectures may be used. For instance, some or all instructions of IRSI application 120 or other instructions may execute on different components of system 100. In particular, voice recognition (e.g., speech-to-text), one or more functions/operations of IRSI application 120, and/or other functions/operations described herein may be performed at computing device 110 and/or computing device 160.

[0165] For instance, computing devices 110 may include server devices and computing devices 160 may include user devices that connect to the server devices. Other architectures may be used as well.

[0166] Although illustrated in FIG. 1 as a single component, computer system 104 may include a plurality of individual components (e.g., computer devices) each programmed with at least some of the functions described herein. In this manner, some components of computer system 104 may perform some functions while other components may perform other

functions, as would be appreciated. The one or more processors 112 may each include one or more physical processors that are programmed by computer program instructions. The various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as the processor(s) 112 are programmed to perform the functions described herein.

[0167] Furthermore, it should be appreciated that although the various instructions are illustrated in FIG. 1 as being co-located within a single processing unit, in implementations in which processor(s) 112 includes multiple processing units, one or more instructions may be executed remotely from the other instructions.

[0168] The description of the functionality provided by the different instructions described herein is for illustrative purposes, and is not intended to be limiting, as any of instructions may provide more or less functionality than is described. For example, one or more of the instructions may be eliminated, and some or all of its functionality may be provided by other ones of the instructions. As another example, processor(s) 112 may be programmed by one or more additional instructions that may perform some or all of the functionality attributed herein to one of the instructions.

[0169] The various instructions described herein may be stored in a storage device 114, which may comprise random access memory (RAM), read only memory (ROM), and/or other memory. The storage device may store the computer program instructions (e.g., the aforementioned instructions) to be executed by processor 112 as well as data that may be manipulated by processor 112. The storage device may comprise floppy disks, hard disks, optical disks, tapes, or other storage media for storing computer-executable instructions and/or data.

[0170] The various components illustrated in FIG. 1 may be coupled to at least one other component via a network, which may include any one or more of, for instance, the Internet, an intranet, a PAN (Personal Area Network), a LAN (Local Area Network), a WAN (Wide Area Network), a SAN (Storage Area Network), a MAN (Metropolitan Area Network), a wireless network, a cellular communications network, a Public Switched Telephone Network, and/or other network. In FIG. 1 and other drawing Figures, different numbers of entities than depicted may be used. Furthermore, according to various implementations, the components

described herein may be implemented in hardware and/or software that configure hardware.

[0171] The various information domains may be stored in one or more databases such as, for example, an Oracle™ relational database sold commercially by Oracle Corporation. Other databases, such as Informix™, DB2 (Database 2) or other data storage, including file-based, or query formats, platforms, or resources such as OLAP (On Line Analytical Processing), SQL (Structured Query Language), a SAN (storage area network), Microsoft Access™ or others may also be used, incorporated, or accessed. The database may comprise one or more such databases that reside in one or more physical devices and in one or more physical locations. The database may store a plurality of types of data and/or files and associated data or file descriptions, administrative information, or any other data.

[0172] Computing devices 110, 160 may each include a server computing device, a desktop computer, a mobile device that is generally portable (e.g., a laptop computer, a tablet computer, a "smartphone," etc.), or other computing device that is programmed by IRSI 120 and/or other computer program instructions.

[0173] Other implementations, uses and advantages of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. The specification should be considered exemplary only, and the scope of the invention is accordingly intended to be limited only by the following claims.

CLAIMS

What is claimed is:

1. A computer implemented method for integrating domain information and semantic parsing to generate meaning representations from natural language input, the method being implemented on a computer system having one or more physical processors programmed with computer program instructions to perform the method, the method comprising:

receiving, by the computer system, a natural language input comprising at least a first input token;

obtaining, by the computer system, a semantic grammar;

determining, by the computer system, a semantic structure of the natural language input based on the semantic grammar;

retrieving, by the computer system, from an information domain, a plurality of domain tokens that match the first token of the natural language input; and

generating, by the computer system, a meaning representation based on the semantic structure and the plurality of domain tokens, wherein the meaning representation is used to execute a computer executable action.

2. The method of claim 1, wherein the plurality of domain tokens are structured into a domain information FST parser that includes at least a first FST path comprising a first set of domain tokens and a second FST path comprising a second set of domain tokens, and wherein generating the meaning representation further comprises:

selecting the first FST path based on a first score of the first FST path and a second score of the second FST path, wherein the first FST path is used to generate the meaning representation.

3. The method of claim 2, wherein the first score is based on a first sum of weights of each domain token among the first set of domain tokens and the second score is based on a second sum of weights of each domain token among the second set of domain tokens, and wherein a given weight for a domain token is based on a level of frequency that the domain token appears in the information domain.

4. The method of claim 2, wherein retrieving the plurality of domain tokens comprises:

initializing an input FST based on the first token and the semantic structure; and

composing the input FST based on the first FST path and the second FST path, wherein the first FST path and the second FST path are integrated with the input FST, and wherein the first FST is selected from the input FST.

5. The method of claim 4, wherein selecting the first FST path comprises selecting a shortest path in the input FST.

6. The method of claim 4, wherein retrieving the plurality of domain tokens comprises:

performing fuzzy or exact matching between domain tokens from the information domain and the first token, wherein the plurality of domain tokens comprises fuzzy or exact matches to the first token.

7. The method of claim 1, the method further comprising:

identifying a second token that is relevant to the first token and the information domain, wherein the second token is not initially included in the natural language input; and

adding the second token to the meaning representation.

8. The method of claim 1, wherein the natural language input comprises at least a second token, the method further comprising:

determining that the second token is not relevant to the information domain; and

omitting the second token from the meaning representation responsive to the determination that the second token is not relevant.

9. The method of claim 1, the method further comprising:

obtaining a phoneme confusion matrix comprising at least two similar sounding words that are disambiguated based on previous training from one or more user utterances; and

disambiguating the first token based on the phoneme confusion matrix.

10. The method of claim 1, the method further comprising:

obtaining one or more dynamic data tokens from a dynamic data source; and

integrating the one or more dynamic data tokens with the plurality of tokens from the information domain, wherein the meaning representation is determined based on the integrated dynamic data tokens.

11. The method of claim 10, wherein the plurality of domain tokens are structured into a domain information FST parser that includes at least a first FST path comprising a first set of domain tokens and a second FST path comprising a second set of domain tokens, and wherein integrating the one or more dynamic data tokens comprises:

generating a dynamic FST based on the one or more dynamic data tokens; and

inserting the dynamic FST into a slot of the domain information FST parser reserved for dynamic data.

12. The method of claim 1, wherein the computer executable action comprises an execution of: a natural language-based search request or a natural language-based command.

13. The method of claim 1, wherein the information domain comprises a plurality of entries of searchable information, and wherein retrieving the plurality of domain tokens that match the first token comprises:

determining at least one entry, which includes the plurality of domain tokens, that is likely being searched for based on the first token.

14. A system for integrating domain information and semantic parsing to generate meaning representations from natural language input, the system comprising:

a computer system comprising one or more physical processors programmed with computer program instructions to:

receive a natural language input comprising at least a first input token;

obtain a semantic grammar;

determine a semantic structure of the natural language input based on the semantic grammar;

retrieve from an information domain, a plurality of domain tokens that match the first token of the natural language input; and

generate a meaning representation based on the semantic structure and the plurality of domain tokens, wherein the meaning representation is used to execute a computer executable action.

15. The system of claim 14, wherein the plurality of domain tokens are structured into a domain information FST parser that includes at least a first FST path comprising a first set of domain tokens and a second FST path comprising a second set of domain tokens, and wherein to generate the meaning representation, the computer system is further programmed to:

select the first FST path based on a first score of the first FST path and a second score of the second FST path, wherein the first FST path is used to generate the meaning representation.

16. The system of claim 15, wherein the first score is based on a first sum of weights of each domain token among the first set of domain tokens and the second score is based on a second sum of weights of each domain token among the second set of domain tokens, and wherein a given weight for a domain token is based on a level of frequency that the domain token appears in the information domain.

17. The system of claim 16, wherein to retrieve the plurality of domain tokens, the computer system is further programmed to:

initialize an input FST based on the first token and the semantic structure; and

compose the input FST based on the first FST path and the second FST path, wherein the first FST path and the second FST path are integrated with the input FST, and wherein the first FST is selected from the input FST.

18. The system of claim 17, wherein to select the first FST path, the computer system is further programmed to: select a shortest path in the input FST.

19. The system of claim 17, wherein to retrieve the plurality of domain tokens, the computer system is further programmed to:

perform fuzzy or exact matching between domain tokens from the information domain and the first token, wherein the plurality of domain tokens comprises fuzzy or exact matches to the first token.

20. The system of claim 14, wherein the computer system is further programmed to:

identify a second token that is relevant to the first token and the information domain, wherein the second token is not initially included in the natural language input; and

add the second token to the meaning representation.

21. The system of claim 14, wherein the natural language input comprises at least a second token, and wherein the computer system is further programmed to:

determine that the second token is not relevant to the information domain; and

omit the second token from the meaning representation responsive to the determination that the second token is not relevant.

22. The system of claim 14, wherein the computer system is further programmed to:

obtain a phoneme confusion matrix comprising at least two similar sounding words that are disambiguated based on previous training from one or more user utterances; and

disambiguate the first token based on the phoneme confusion matrix.

23. The system of claim 14, wherein the computer system is further programmed to:

obtain one or more dynamic data tokens from a dynamic data source; and

integrate the one or more dynamic data tokens with the plurality of tokens from the information domain, wherein the meaning representation is determined based on the integrated dynamic data tokens.

24. The system of claim 23, wherein the plurality of domain tokens are structured into a domain information FST parser that includes at least a first FST path comprising a first set of domain tokens and a second FST path comprising a second set of domain tokens, and wherein to integrate the one or more dynamic data tokens, the computer system is further programmed to:

generate a dynamic FST based on the one or more dynamic data tokens; and

insert the dynamic FST into a slot of the domain information FST parser reserved for dynamic data.

25. The system of claim 14, wherein the computer executable action comprises an execution of: a natural language-based search request or a natural language-based command.

26. The system of claim 14, wherein the information domain comprises a plurality of entries of searchable information, and wherein to retrieve the plurality of domain tokens that match the first token, the computer system is further programmed to:

determine at least one entry, which includes the plurality of domain tokens, that is likely being searched for based on the first token.

27. A method of generating an information domain FST parser for integrating domain information with semantic parsing to generate a meaning representation, the method being implemented on a computer system having one or more physical processors programmed with computer program instructions to perform the method, the method comprising:

obtaining, by the computer system, a plurality of entries of an information domain, wherein each entry comprises one or more domain tokens;

determining, by the computer system, a weight for each domain token, irrespective of whether a given domain token appears in more than one entry, wherein the weight indicates a level of frequency in which the given token appears in the information domain;

defining, by the computer system, for a given entry, a plurality of combinations of the one or more domain tokens, wherein each combination of the one or more domain tokens

represent a different order of the one or more domain tokens and include some or all of the one or more domain tokens for the given entry;

determining, by the computer system, a score for each combination, wherein the score is based on the weight for each domain token involved in the combination; and

storing, by the computer system, the plurality of combinations for each of the plurality of entries.

28. The method of claim 27, wherein the plurality of combinations for each of the plurality of entries are collectively stored as an information domain FST parser, and wherein each combination represents an FST path of the information domain FST parser.

29. The method of claim 28, wherein the score for each combination comprises a path score for each FST path.

30. The method of claim 28, the method further comprising: optimizing the information domain FST parser.

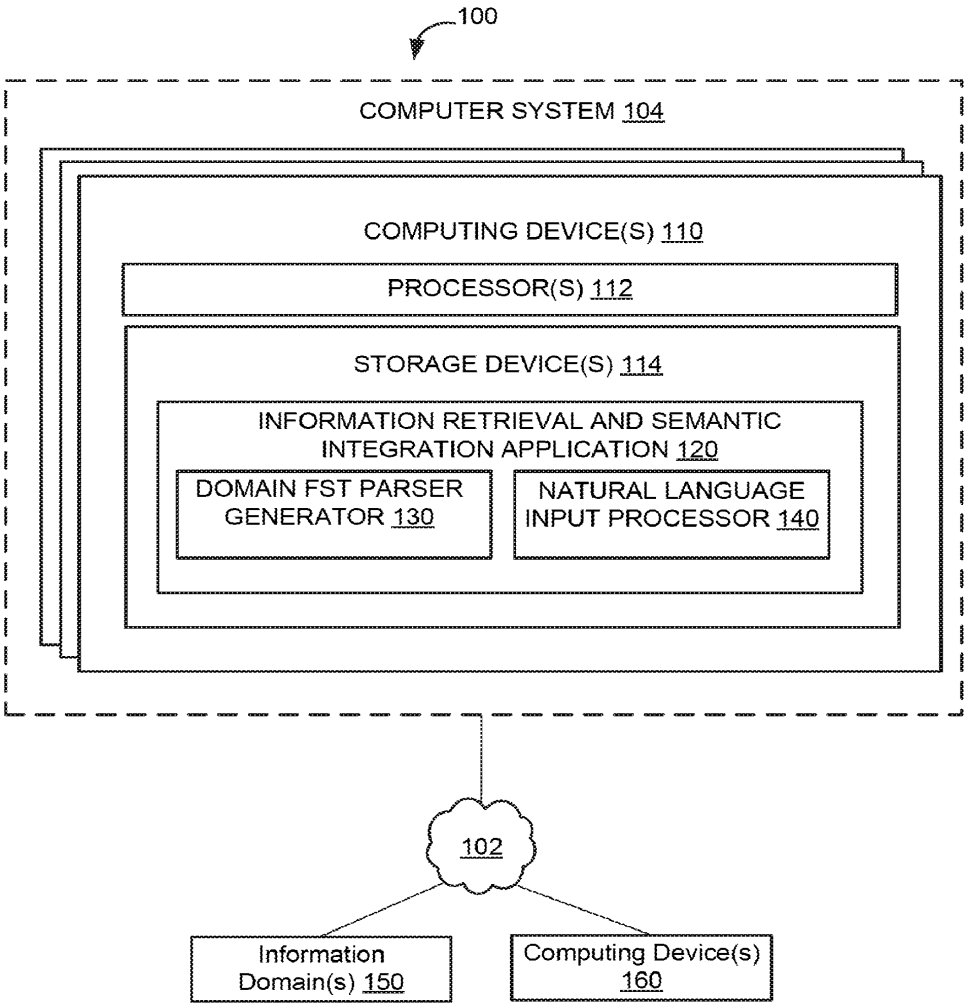


FIG. 1

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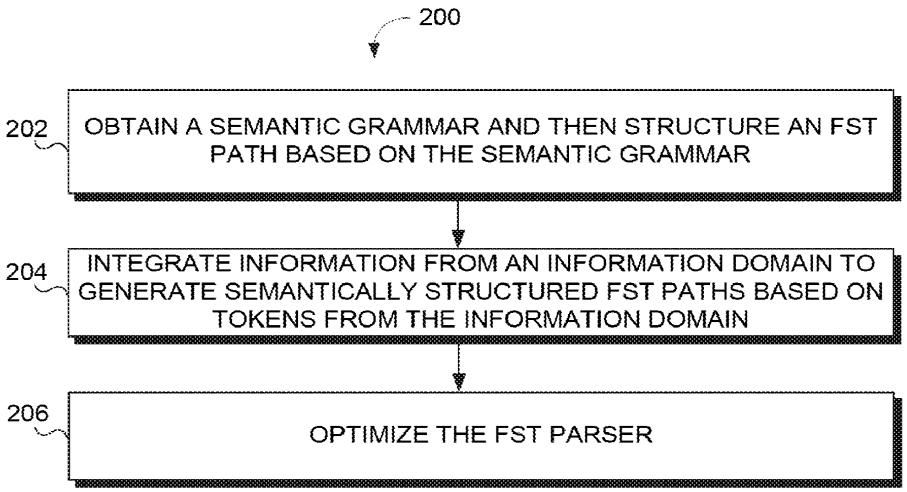


FIG. 2

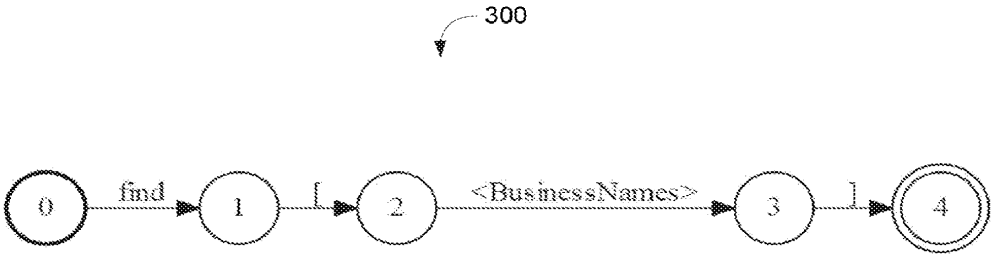


FIG. 3

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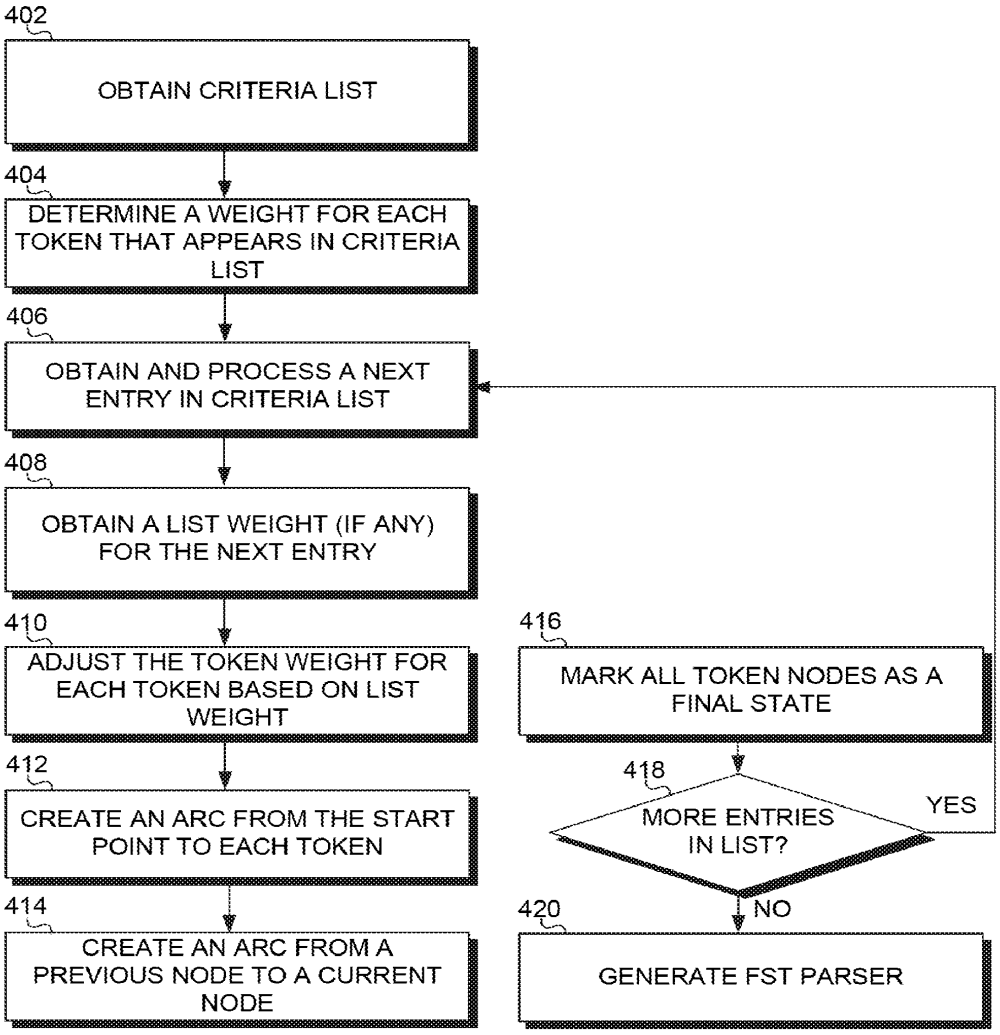


FIG. 4

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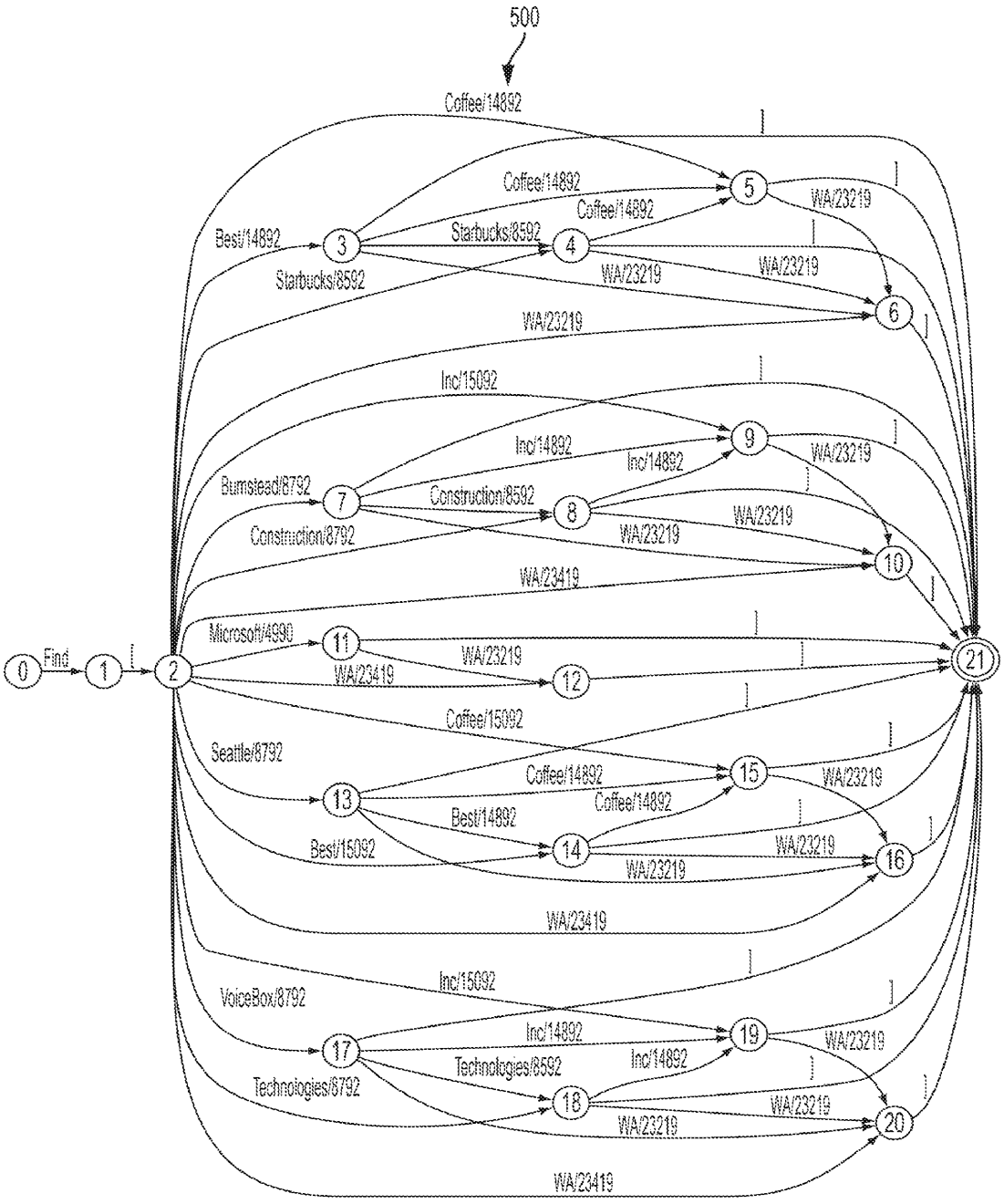


FIG. 5

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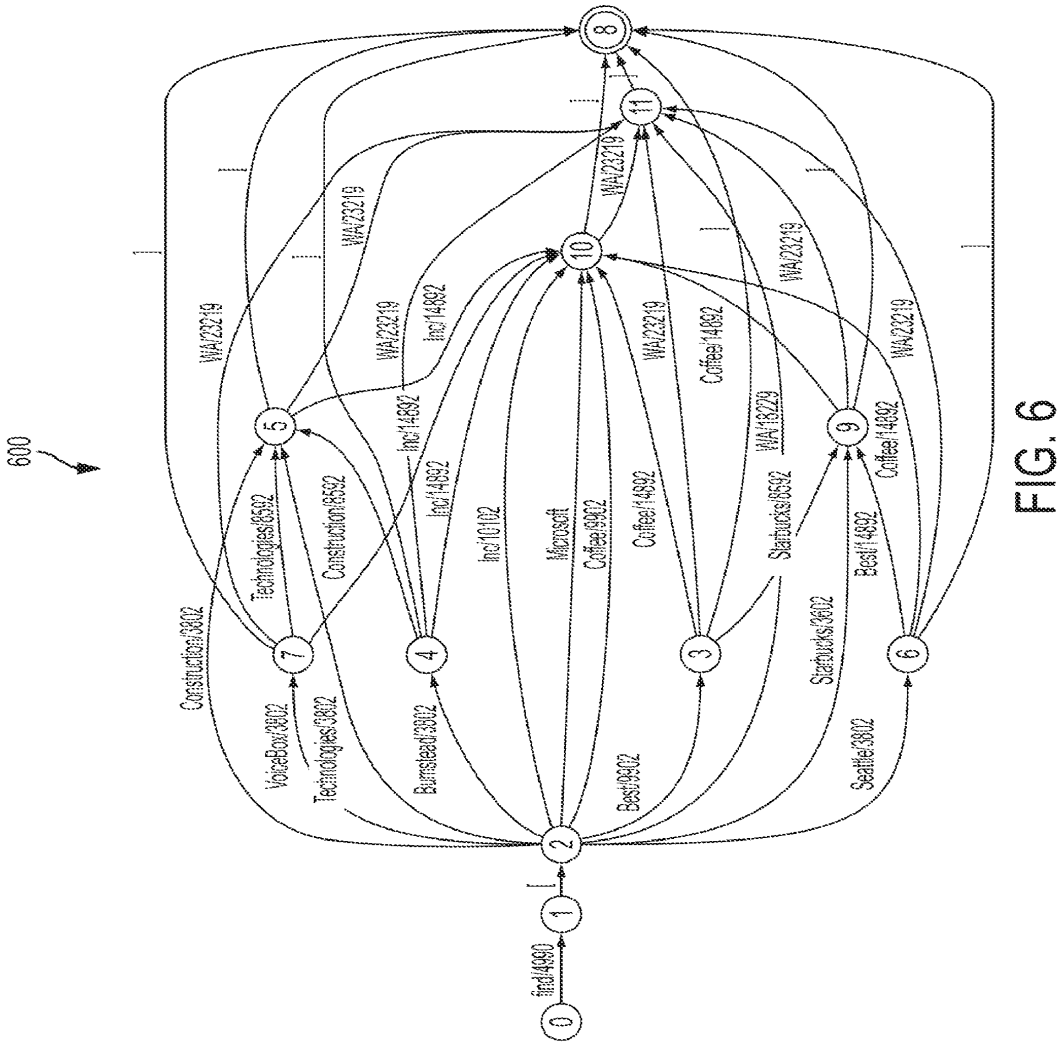


FIG. 6

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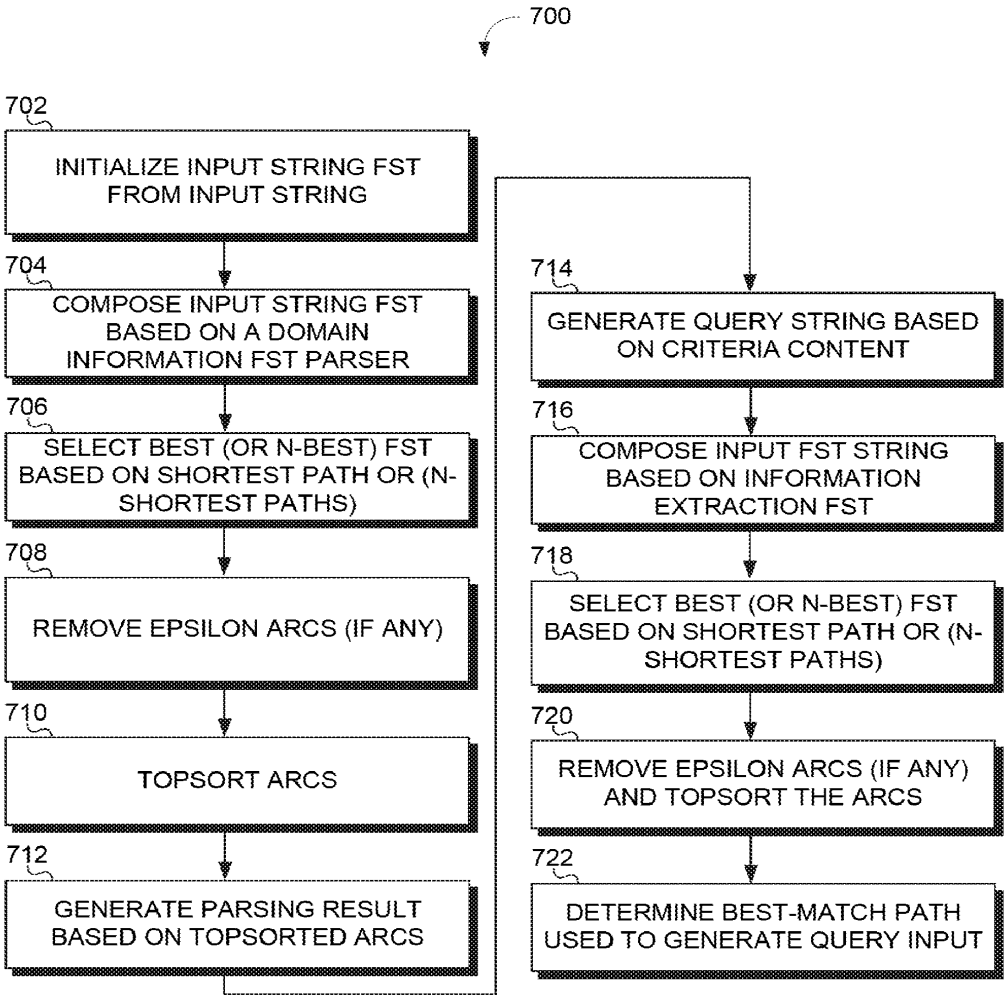


FIG. 7

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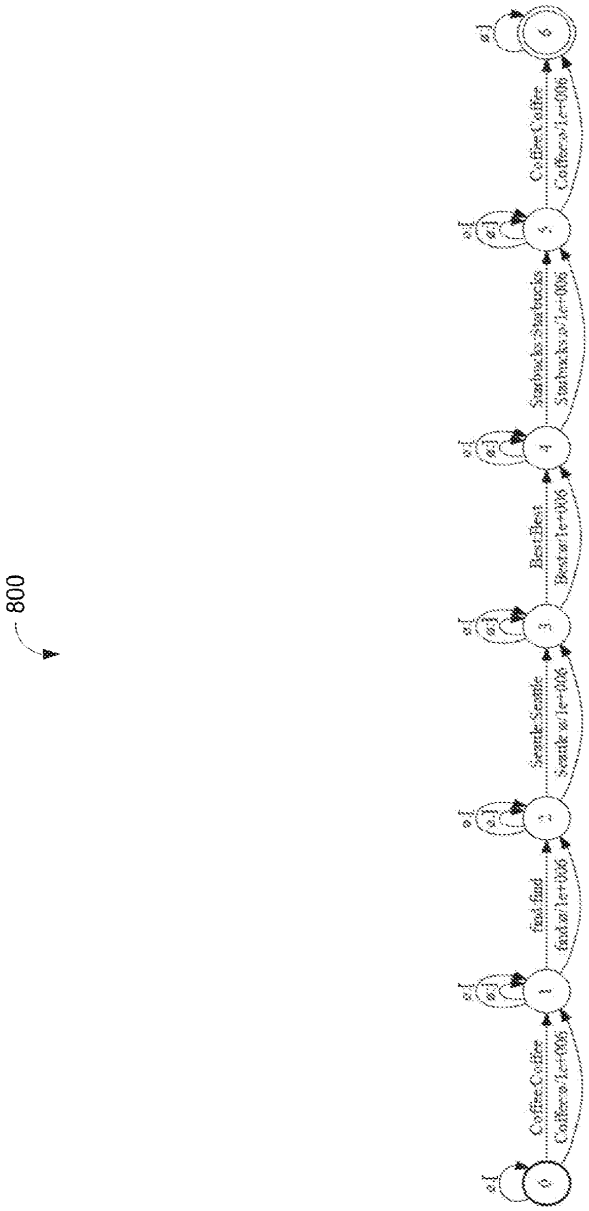


FIG. 8

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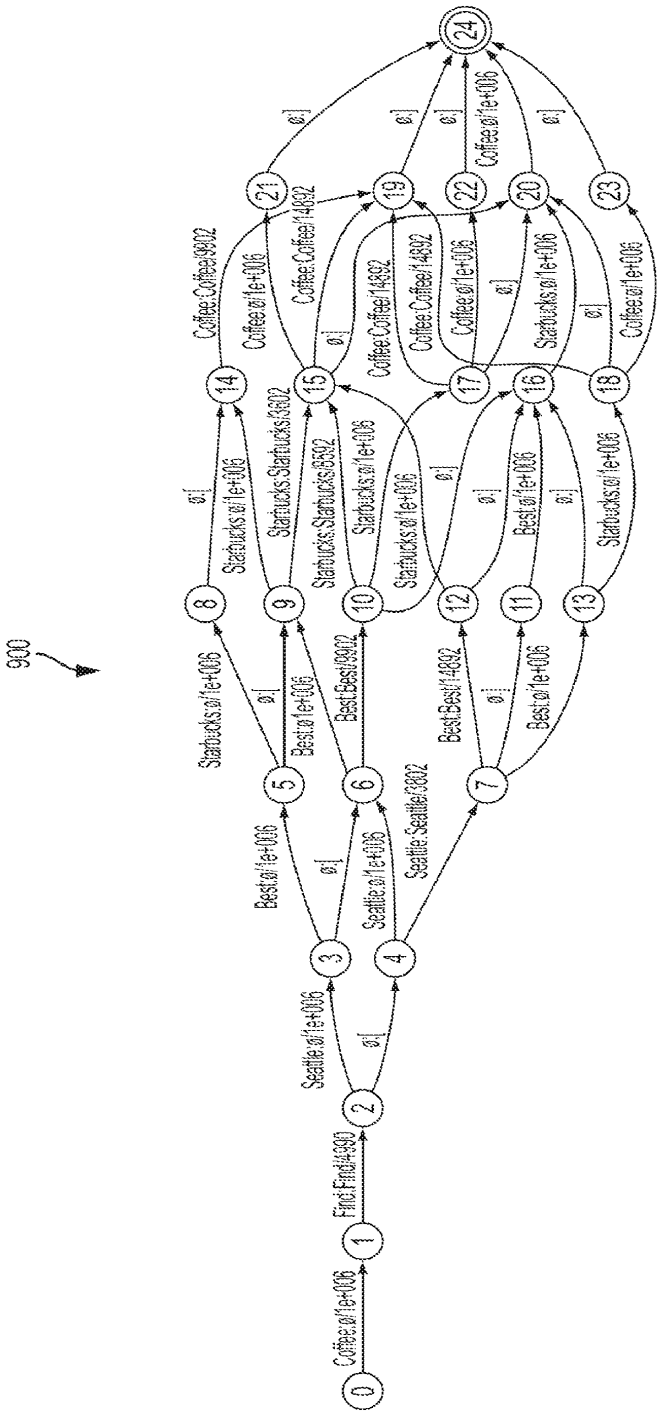

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FIG. 9

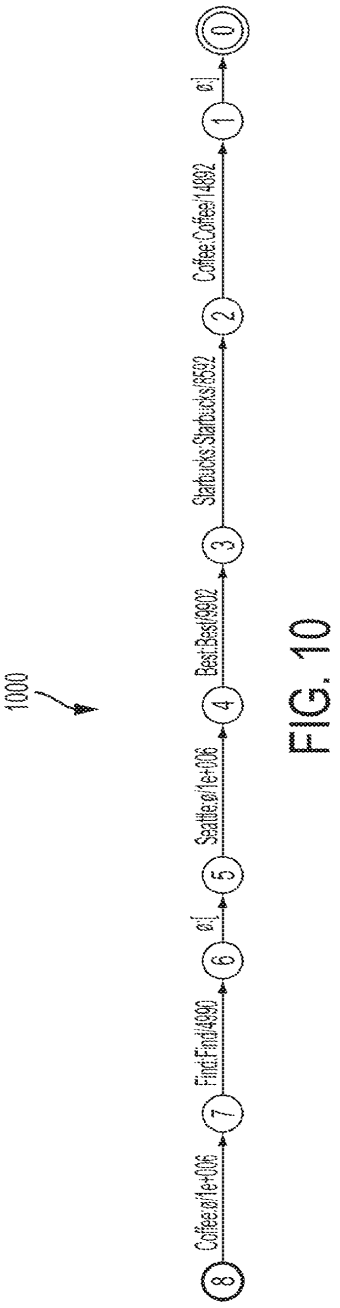


FIG. 10

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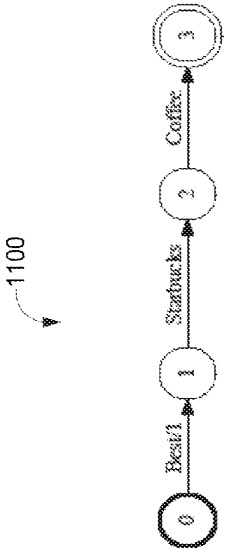


FIG. 11

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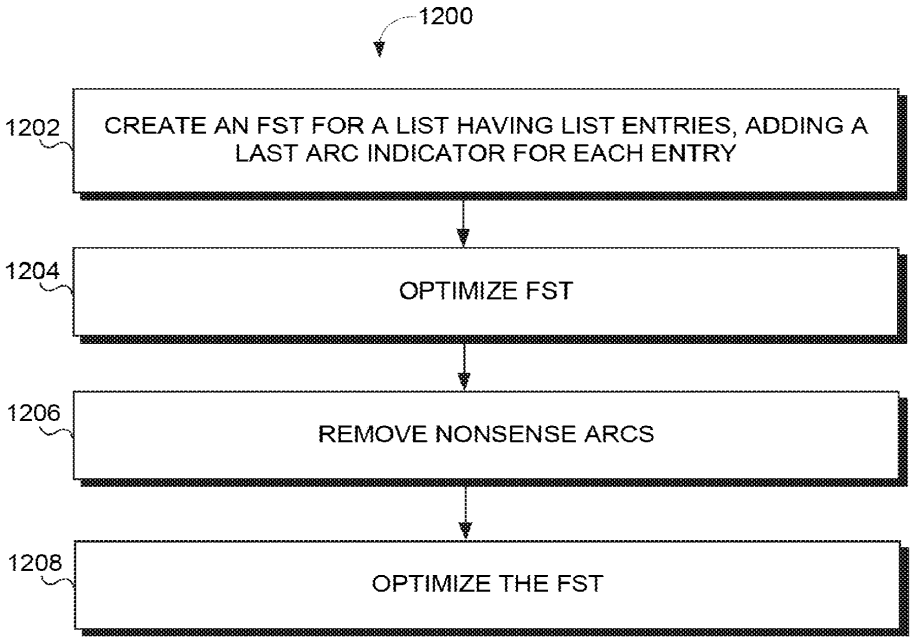


FIG. 12

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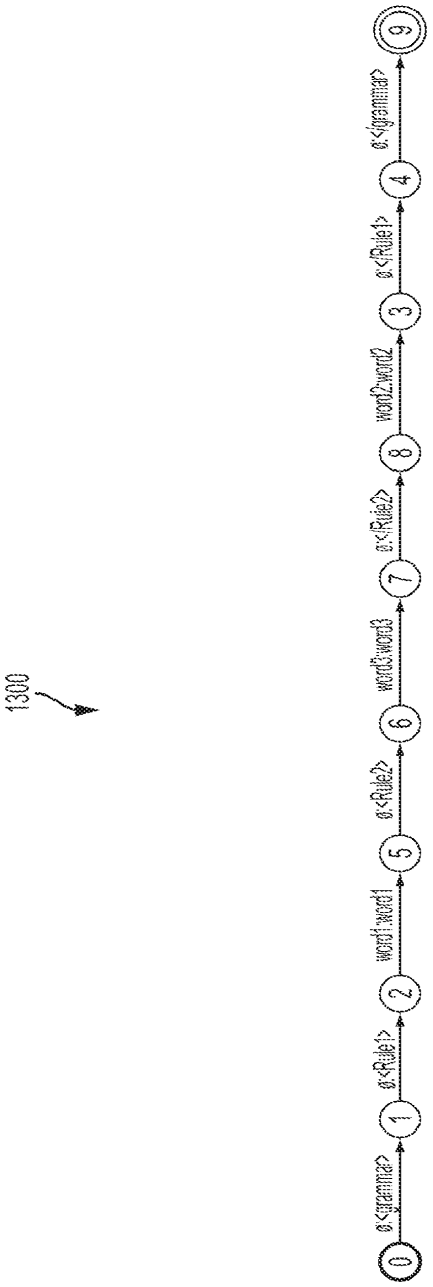


FIG. 13

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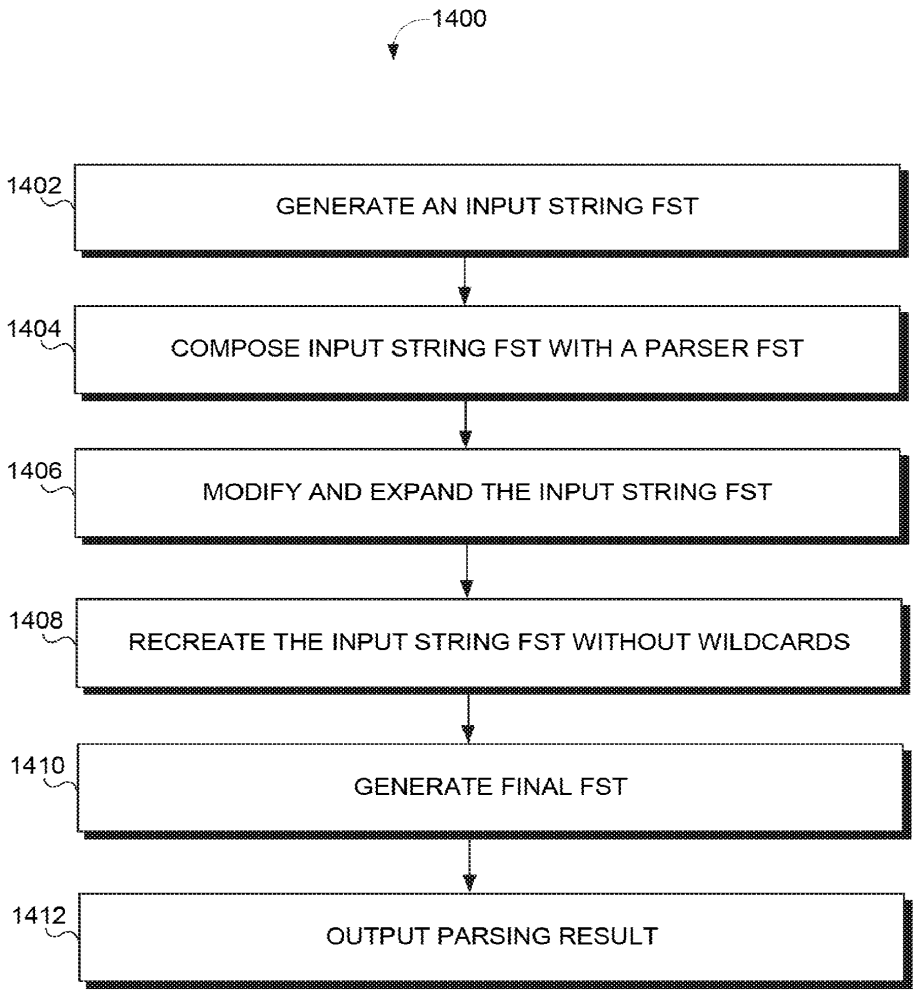


FIG. 14

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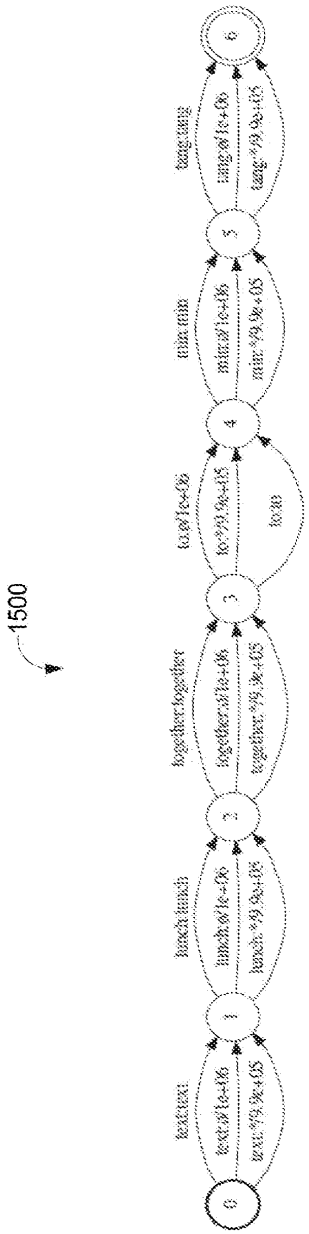


FIG. 15

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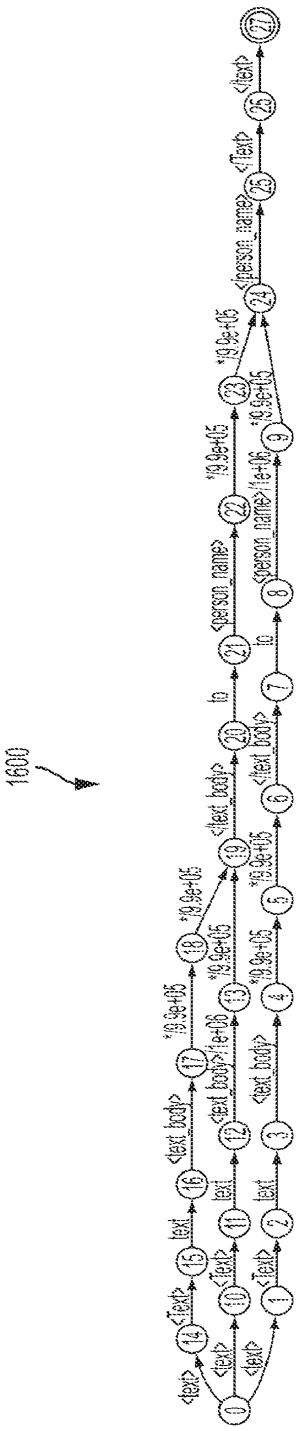


FIG. 16

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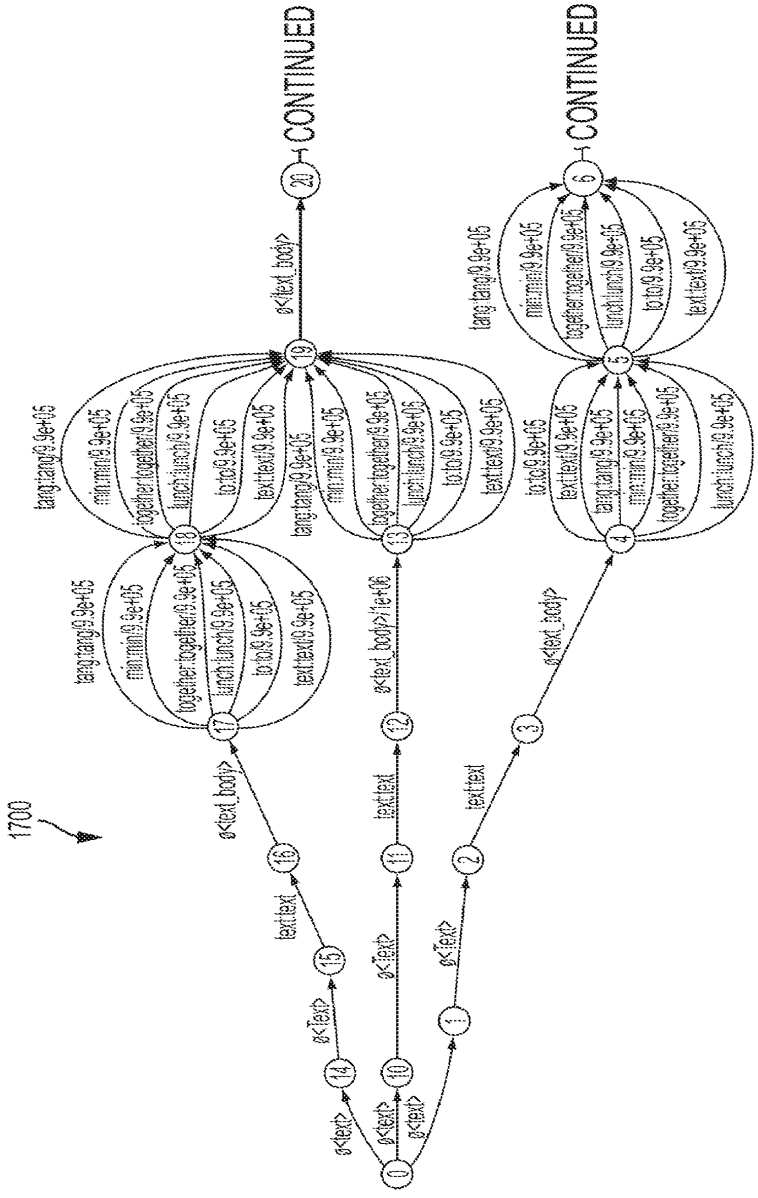


FIG. 17

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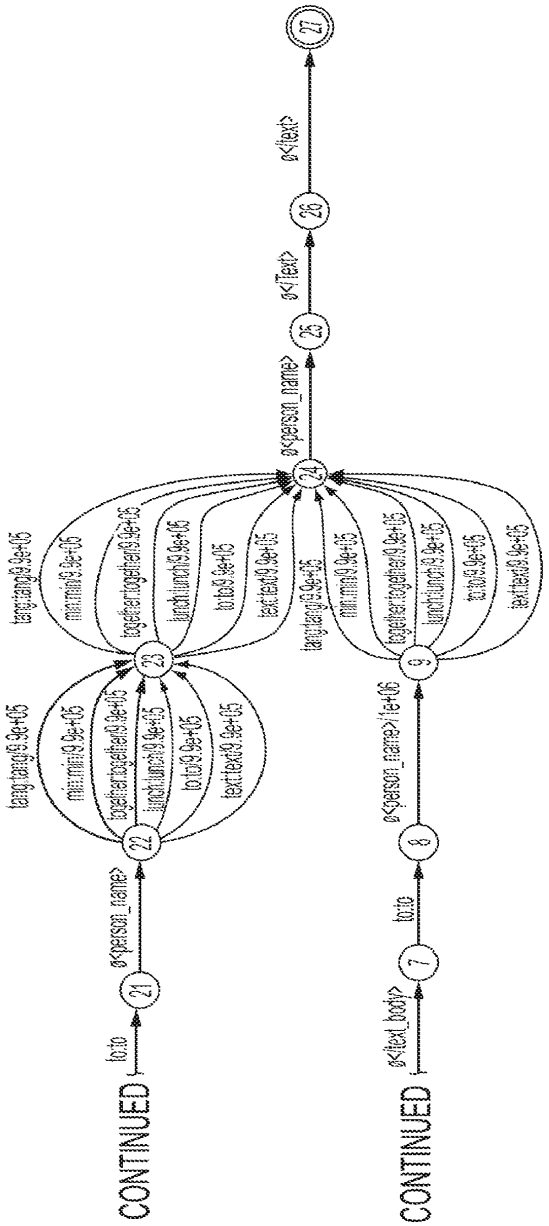


FIG. 17
CONTINUED

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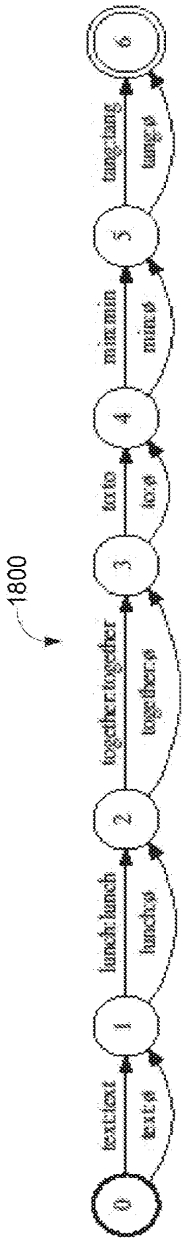


FIG. 18

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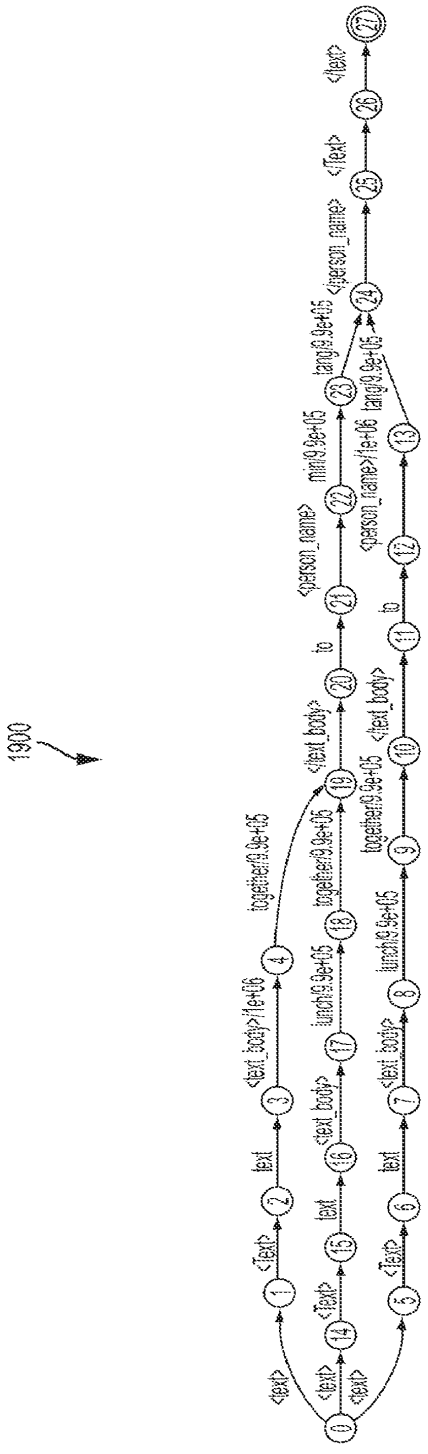


FIG. 19

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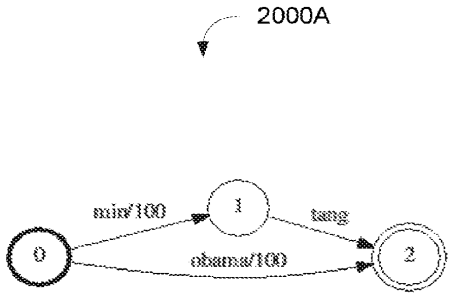


FIG. 20A

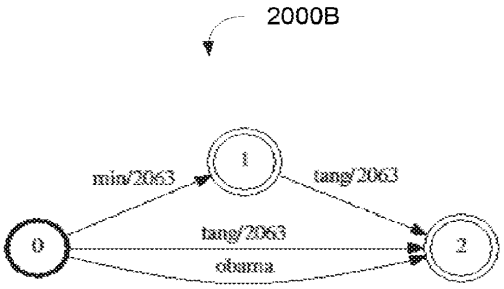


FIG. 20B

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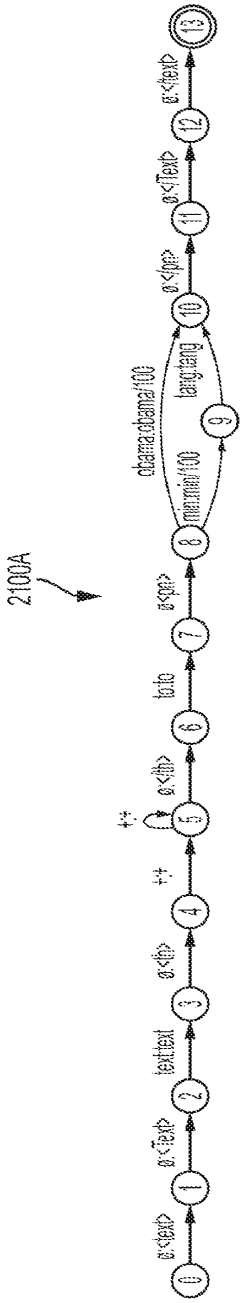


FIG. 21A

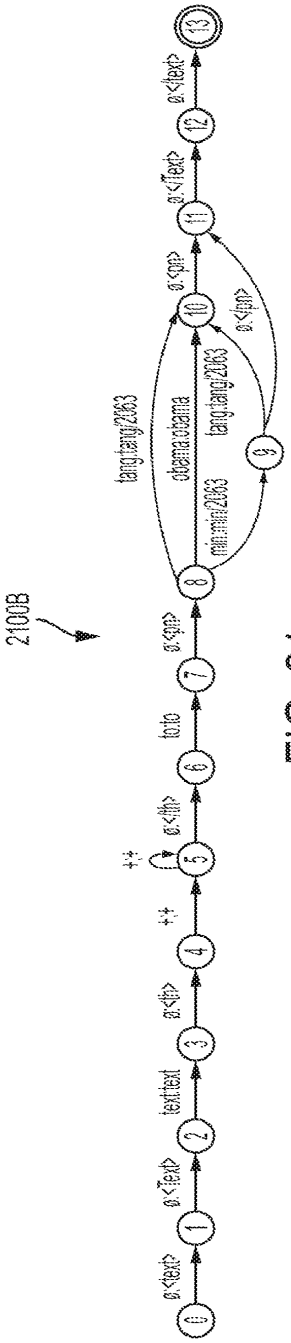


FIG. 21B

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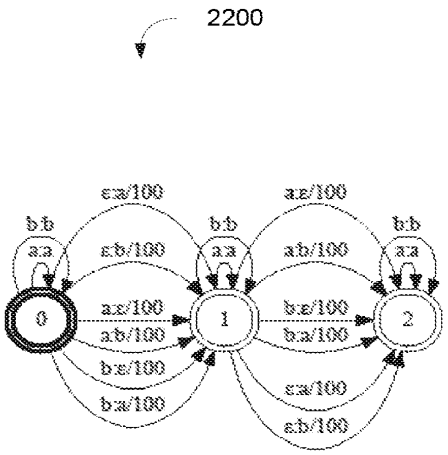


FIG. 22

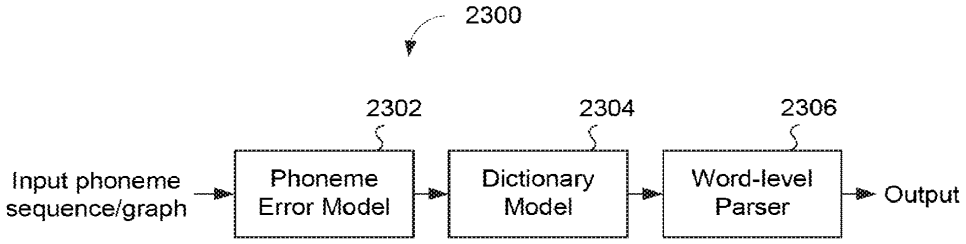


FIG. 23

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/050263

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 17/27 (2015.01)
CPC - G06F 17/271 (2015.10)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - G06F 17/27, G06F 17/28, G06F 17/30 (2015.01)
USPC - 1/1, 704/9, 707/999.006, 707/E17.014

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - G06F 17/271, G06F 17/2785, G06F 17/28, G06F 17/3043, G06F 17/3061 (2015.10) (keyword delimited)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Orbit, Google Patents, Google Scholar, Google.
Search terms used: integrate domain information, semantic parsing, generate meaning representations from natural language input, processor

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/0104071 A1 (PRAGADA et al) 01 May 2008 (01.05.2008), entire document	1-30
Y	US 2014/0236575 A1 (MICROSOFT CORPORATION) 21 August 2014 (21.08.2014), entire document	1-30
Y	US 2011/0119049 A1 (YLONEN) 19 May 2011 (19.05.2011), entire document	1-26
Y	US 2003/0187643 A1 (VAN THONG et al) 02 October 2003 (02.10.2003), entire document	9, 22
Y	US 6,816,830 B1 (KEMPE) 09 November 2004 (09.11.2004), entire document	2-6, 11, 15-19, 24, 27-30
Y	US 2008/0294437 A1 (NAKANO et al) 27 November 2008 (27.11.2008), entire document	3, 11, 16-19, 24, 27-30
Y	US 2012/0046935 A1 (NAGAO) 23 February 2012 (23.02.2012), entire document	2-6, 15-19, 29
Y	US 6,073,098 A (BUCHSBAUM et al) 06 June 2000 (06.06.2000), entire document	5, 18
A	US 2009/0248605 A1 (MITCHELL et al) 01 October 2009 (01.10.2009), entire document	1-30
A	US 2007/0112555 A1 (LAVI et al) 17 May 2007 (17.05.2007), entire document	1-30
A	US 5,265,065 A (TURTLE) 23 November 1993 (23.11.1993), entire document	1-30
A	US 5,794,050 A (DAHLGREN et al) 11 August 1998 (11.08.1998), entire document	1-30

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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Date of the actual completion of the international search	Date of mailing of the international search report
31 October 2015	20 JAN 2016
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer Blaine Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

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(71) Applicant: **VOICEBOX TECHNOLOGIES CORPORATION** [US/US]; 11980 NE 24th Street, Suite 100, Bellevue, WA 98005 (US).

(72) Inventors: **KENNEWICK, Michael, R, Jr.**; 13407 NE 37th Place, Bellevue, WA 98075 (US). **KENNEWICK, Michael, R, Sr.**; 13407 NE 37th Place, Bellevue, WA 98075 (US).

(74) Agents: **KOO, Hean, L.** et al.; Sheppard Mullin Richter & Hampton LLP, 2099 Pennsylvania Avenue, N.W., Suite 100, Washington, DC 20006 (US).

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Published:
— *with international search report (Art. 21(3))*

(54) Title: SYSTEM AND METHOD FOR PROVIDING FOLLOW-UP RESPONSES TO PRIOR NATURAL LANGUAGE INPUTS OF A USER

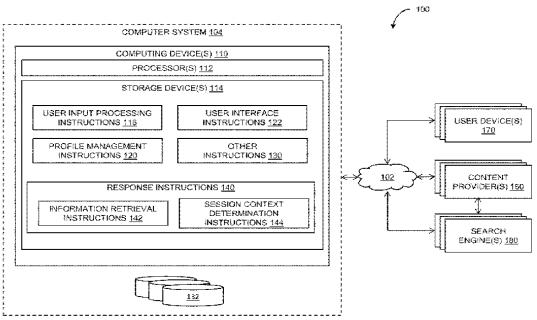


FIG. 1

(57) Abstract: In certain implementations, follow-up responses may be provided for prior natural language inputs of a user. As an example, a natural language input associated with a user may be received at a computer system. A determination of whether information sufficient for providing an adequate response to the natural language input is currently accessible to the computer system may be effectuated. A first response to the natural language input (that indicates that a follow-up response will be provided) may be provided based on a determination that information sufficient for providing an adequate response to the natural language input is not currently accessible. Information sufficient for providing an adequate response to the natural language input may be received. A second response to the natural language input may then be provided based on the received sufficient information.

WO 2016/061309 A1

System and Method for Providing Follow-Up Responses to Prior Natural Language Inputs of a User

Cross-Reference to Related Applications

[001] This application claims the benefit of U.S. Provisional Patent Application Serial No. 62/064,329, entitled "System and Method for Providing Follow-Up Responses to Prior Natural language Inputs of a User", filed October 15, 2014, which is hereby incorporated by reference in its entirety.

Field of the Invention

[002] The invention relates to systems and methods of providing responses to natural language inputs.

Background of the Invention

[003] Electronic user devices have emerged to become nearly ubiquitous in the everyday lives of many people. One of the reasons for this increased use is the convenience of receiving information with a user device, for example, via personal assistant software capable of processing natural language input. In many cases, however, information for providing an adequate response to a natural language request from a user may not be immediately available or accessible to the personal assistant software (e.g., because of poor network connectivity, service outage, etc.). In such cases, the personal assistant is unable to provide an adequate response and the user has to remember to provide the query at a later time to receive an adequate response. These and other drawbacks exist.

Summary of the Invention

[004] The invention relates to systems and methods for providing responses to natural language inputs. As an example, system responses to natural language inputs (e.g., utterances, gestures, etc.) may be facilitated by enabling follow-up responses (or real-time updates in the form of follow-up responses) to prior natural language inputs of a user (or the user's prior requests). These follow-up responses may, for instance, be provided for

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presentation to the user without the user having to specify a need for a follow-up. As such, in an implementation, a user need not provide a user request specifying one or more system actions to be performed at a later time for those system actions to be subsequently performed.

[005] In one scenario, for example, a user may ask a personal assistant application to set a thermostat in his/her house to a certain temperature (e.g., "72 degrees or other temperature"). However, a service associated with the thermostat may be temporarily down, the personal assistant application may not be able to immediately satisfy the user's command. As such, as a result of its inability to receive confirmation of a connection with the associated service, the personal assistant application may alert the user of its inability to currently connect to the user's thermostat and indicate that it will follow-up with the user when it is able to set the user's thermostat to the requested temperature. The personal assistant application may thereafter periodically check with the associated service to see if access to set the thermostat is available. When the access becomes available (and without further user input regarding setting of the thermostat after the user's initial command) the personal assistant application may transmit instructions to set the thermostat to the requested temperature. Upon receiving confirmation of the requested setting from the associated service, the personal assistant application may provide a follow-up response for presentation to the user that informs the user that the thermostat has been set to the requested temperature.

[006] In another scenario, a user may ask a personal assistant application to inform him/her of nearby pizza restaurants (e.g., "Are there pizza restaurant around here?"). However, if the personal assistant application is hosted on a user device of the user, and the user device does not currently have network access (e.g., no cellular or WiFi connection), the personal assistant application may inform the user of the lack of network access and that it will follow-up with the user when it is able to perform the requested query. At a subsequent time, upon detection of network access (and without further user input regarding queries for pizza restaurants), the personal assistant application may initiate the requested query. When the results of the requested query are received, the personal assistant application may formulate a response for presentation to the user based on the query results.

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[007] In an implementation, a follow-up response to a prior natural language input may be provided for presentation to a user during an interactive session (e.g., between a personal assistant application and the user) other than the interactive session in which the user provided the prior natural language input. As such, in some cases, one or more subsequent natural language inputs may be received from the user and/or system responses to the subsequent natural language inputs may be provided to the user before the follow-up response is provided. In further cases, the subsequent user inputs and their corresponding responses may not be related to the prior natural language input for which the follow-up response is provided.

[008] In an implementation, context information associated with an interactive session between a system (or a personal assistant application thereof) and a user may be utilized to tailor a follow-up response provided during the interactive session. As an example, if the topic of the current interactive session (e.g., a subsequent dialog session) is different than a topic of the prior natural language input (or its related user request), the system may utilize the context information associated with the interactive session to generate a follow-up response to the prior natural language input that may "fit" better within the current interactive session. In one use case, for instance, if the prior natural language input comprises a query for a friend's birthday, and the information regarding the friend's birthday is obtained during a dialog between the system and the user about the user's anniversary, the follow-up response that is generated so that the response is related (at least in part) to the current dialog (e.g., "Speaking of important dates, you asked me earlier about your friend's birthday; it's next Friday").

[009] Various other aspects of the invention will be apparent through the detailed description of the invention and the drawings attached hereto. It is also to be understood that both the foregoing general description and the following detailed description are exemplary and not restrictive of the scope of the invention. As used in the specification and in the claims, the singular form of "a", "an", and "the" include plural referents unless the context clearly dictates otherwise. In addition, as used in the specification and the claims, the term "or" means "and/or" unless the context clearly dictates otherwise.

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Brief Description of the Drawings

[010] FIG. 1 illustrates a system for providing follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention.

[011] FIG. 2 illustrates a system for facilitating natural language processing, according to an implementation of the invention.

[012] FIG. 3 illustrates a flow diagram for a method of providing follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention.

[013] FIG. 4 illustrates another flow diagram for a method of providing follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention.

[014] FIG. 5 illustrates a screenshot of a user interface which provides a response indicating that a follow-up response will be provided, according to an implementation of the invention.

[015] FIG. 6 illustrates a screenshot of a user interface which provides follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention.

[016] FIG. 7 illustrates a screenshot of a user interface which provides follow-up responses to prior natural language inputs associated with a user in between unrelated subsequent user inputs and/or responses to the subsequent user inputs, according to an implementation of the invention.

Detailed Description of the Invention

[017] In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the implementations of the invention. It will be appreciated, however, by those having skill in the art that the implementations of the invention may be practiced without these specific details or with an equivalent arrangement. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the implementations of the invention.

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[018] FIG. 1 illustrates a system 100 of providing follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention.

[019] In an implementation, system 100 may facilitate natural language responses to natural language inputs (e.g., utterances, gestures, etc.) by enabling follow-up and/or real time updated responses for prior natural language inputs of a user (e.g., the user's prior requests) without the user having to specify a need for follow-up. In an implementation, system 100 may be enabled to obtain one or more follow-up and/or real-time updates related to a prior natural language input of a user, and provide one or more follow-up and/or real-time responses to the prior natural language input. In an implementation, the follow-up and/or real-time updates and responses to/from system 100 to prior natural language inputs of a user may be facilitated by enabling asynchronous full-duplex interaction between the user and system 100. As an example, multiple channels of communication between a personal assistant application of system 100 and the user may be provided, allowing at least one channel for the personal assistant application to receive natural language inputs (or its corresponding user request) from the user, and at least one channel for the personal assistant application to provide responses to the user. A user input may, for instance, trigger one or more system responses (e.g., including system follow-up responses) that may be provided before, during, or after receipt of subsequent user inputs and/or responses to those subsequent user inputs. In this way, a user and a personal assistant may continue a dialog with one another without having to wait for the personal assistant to provide a response (or an adequate response) to any particular natural language input of the user.

[020] In an implementation, system 100 may continue to receive and/or respond to natural language inputs from a user before providing a response (or an adequate response) to a prior natural language input. System 100 may be enabled to subsequently provide a follow-up response when it is able to obtain sufficient information related to the prior natural language input to provide an adequate response. In this way, a user and system 100 may continue to dialog with one another without having to wait for system 100 to provide a response (or an adequate response) to any particular natural language input of the user. For example, the user may input a query: "When is Jane Doe's birthday?" System 100 may analyze the query and determine that the best place to look for an answer to this query is the Facebook profile

of Jane Doe. However, in one scenario, Facebook may be inaccessible from the network available to system 100 (e.g., because of an office firewall). System 100 may then respond to the user with a response indicating that Jane Doe's Facebook profile is not currently accessible (and/or that it will get back to the user at a later time). System 100 may then continue to interact with the user rather than waiting for the Facebook profile to be accessible. Nevertheless, when system 100 eventually obtains information specifying Jane Doe's birthday (e.g., from her Facebook profile or an alternative source), it may thereafter follow-up with a subsequent response to the user's initial query that specifies Jane Doe's birthday.

[021] In an implementation, system 100 may obtain updated information related to a natural language input for which system 100 has previously provided a response. System 100 may generate a follow-up response based on the updated information, and provide the follow-up response for the natural language input (e.g., even if an adequate response to the natural language input may have previously been provided by system 100).

[022] For example, a user may input a query: "How long will it take to get home today?" System 100 may then query a mapping and traffic application to provide an estimated time of travel based on current traffic conditions. Since the user did not provide a time of departure, the current estimated time of travel may be considered an adequate response. The user may continue to interact with system 100, e.g., to set up a reminder for picking up groceries on the way home. The user may at a subsequent time decide to use a messaging application to send a message to his/her spouse indicating that the user is on the way home. Upon processing of the message, system 100 may determine that the user is driving (or about to drive) home. As such, based on this determination, and without further user input requesting an estimated travel time, system 100 may reassess the current traffic conditions and provide an estimated time of travel as a follow-up response to the user's prior inquiry for an estimated travel time to the user's house.

[023] In an implementation, system 100 may obtain updated information and provide follow-up responses (based on the updated information) in real-time. For example, a user may input a query: "Who is winning the Monte Carlo Formula 1 Grand Prix?" In this instance, as the positions of drivers competing in the race change, system 100 may keep providing

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follow-up responses to the user, e.g., "Felipe Massa is currently in the first position"; "Lewis Hamilton has just passed Felipe Massa to take back the first position" and so forth. In an implementation, for example, these follow-up responses regarding the Formula 1 race may be provided by a personal assistant in between receipt of other natural language inputs (e.g., related to other user requests) from the user and/or responses of the personal assistant to the other natural language inputs.

[024] In an implementation, upon generation of a follow-up response based on updated information related to a prior natural language input of a user, system 100 may provide the follow-up response to the user during an interactive session (e.g., a dialog) between system 100 and the user that is related or unrelated to the prior natural language input from the user. For example, after receiving a first response (e.g., "Felipe Massa is currently in the first position"), the user may decide to continue a dialog with system 100 with inputs relating to current standings of teams and drivers in the current Formula 1 season. If during this dialog, system 100 receives the updated information indicating that Lewis Hamilton has passed Felipe Massa, system 100 may interrupt the dialog to provide this updated information (with a response, e.g., "By the way, Lewis Hamilton has just passed Felipe Massa to take back the first position") and subsequently provide responses to the user's queries relating to the current standings.

[025] Alternatively, in an implementation, a determination to provide a follow-up response based on the updated information may be effectuated without regard to whether the interactive session is related to the prior natural language input. After receiving the first response, the user may decide to set up reminders for various meetings that the user is supposed to attend. If during this dialog, system 100 receives the updated information regarding a change in position in the race, system 100 may interrupt the session relating to the reminders to provide the updated race status and subsequently continue with setting reminders.

[026] In another implementation, information regarding an interactive session (e.g., context information associated with the interactive session) may be utilized to tailor follow-up responses (to prior natural language inputs) that are provided during the interactive session. For example, a user may have input a query regarding Jane Doe's birthday at a time when the

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best resource (e.g., Facebook profile) for providing a correct answer to the query may be inaccessible to system 100. At a later time, if the Facebook profile of Jane Doe becomes accessible, system 100 may interrupt whatever interactive session the user may be engaged in (e.g., even if the session is regarding a different topic, such as Formula 1 racing) to provide Jane Doe's birthday. Upon recognizing that the topic of the current interactive session is unrelated to the user's prior inquiry, system 100 may apologize for the interruption and remind the user of the prior inquiry before informing the user of Jane Doe's birthday (e.g., "Sorry to interrupt, but you previously asked about Jane Doe's birthday. It's next Wednesday."). Additionally, as an example, if system 100 determines that Jane Doe's birthday is the same as some famous Formula 1 driver (e.g., Nicki Lauda), system 100, in the context of Formula 1 racing, may provide this additional information in the follow-up response(e.g., "It so happens that Jane Doe has the same birthday as Nicki Lauda").

[027] Other uses of system 100 are described herein and still others will be apparent to those having skill in the art. Having described a high level overview of some of the system functions, attention will now be turned to various system components that facilitate these and other functions.

[028] System Components

[029] System 100 may include a computer system 104, one or more content providers 160, one or more user devices 170, one or more search engines 180, and/or other components. Computer system 104 may interface with search engine(s) 180 to query for information for providing a response to a natural language user input, and/or content provider(s) 160 to allow users to access information offered by content provider(s) 160. Search engine(s) 180 may interface with content provider(s) to provide the information to computer system 104. Computer system 104 may further interface with various interfaces of the user device(s) 170 such that users may interact with computer system 104.

[030] To facilitate these and other functions, computer system 104 may include one or more computing devices 110. Each computing device 110 may include one or more processors 112, one or more storage devices 114, and/or other components.

[031] Processor(s) 112 may be programmed by one or more computer program instructions, which may be stored in storage device(s) 114. The computer program instructions may

include, without limitation, user input processing instructions 118, profile management instructions 120, user interface instructions 122, response instructions 140, and/or other instructions 130, each of which may themselves include different sets of instructions that each program the processor(s) 112 (and therefore computer system 104) to perform one or more operations described herein. For example, response instructions 140 may include information retrieval instructions 142, and session context determination instructions 144. Other applications may, of course, include one or more of the instructions 118-152 to perform one or more operations as described herein.

[032] In some implementations, a given user device 170 may comprise a given computer device 110. As such, the given user device 170 may comprise processor(s) 112 that are programmed with one or more computer program instructions, such as user input processing instructions 118, profile management instructions 120, user interface instructions 122, response instructions 140, information retrieval instructions 142, session context determination instructions 144, or other instructions 130.

[033] As used hereinafter, for convenience, the foregoing instructions will be described as performing an operation, when, in fact, the various instructions may program processor(s) 112 (and thereafter computer system 104) to perform the operation. It should be appreciated that the various instructions are described individually as discreet sets of instructions by way of illustration and not limitation, as two or more of the instructions may be combined.

[034] User Input Processing

[035] In an implementation, user input processing instructions 118 may process one or more user inputs of a user to determine one or more user requests that are intended by the user when the user provided the user inputs. The user inputs may comprise an auditory input (e.g., received via a microphone), a visual input (e.g., received via a camera), a tactile input (e.g., received via a touch sensor device), an olfactory input, a gustatory input, a keyboard input, a mouse input, or other user input. As described elsewhere herein, user input processing instructions 118 may comprise instructions associated with one or more speech recognition engines (e.g., speech recognition engine(s) 220 of FIG. 2), one or more natural language processing engines (e.g., natural language processing engine(s) 230 of FIG. 2), or

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other components for processing user inputs to determine user requests related to the user inputs.

[036] In one use case, if the user input is a natural language utterance spoken by a user, the natural language utterance may be processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine a user request intended by the user when the user provided the natural language utterance. A determination of the user request may, for instance, comprise predicting one or more potential user requests intended by the user, assigning a confidence score to each of the potential user requests, and selecting the potential user request with the highest confidence score as the user request intended by the user.

[037] FIG. 2 illustrates a system 200 for facilitating natural language processing, according to an implementation of the invention. As shown in FIG. 2, system 200 may comprise input device(s) 210, speech recognition engine(s) 220, natural language processing engine(s) 230, application(s) 240, output device(s) 250, database(s) 132, or other components.

[038] In an implementation, one or more components of system 200 may comprise one or more computer program instructions of FIG. 1 and/or processor(s) 112 programmed with the computer program instructions of FIG. 1. As an example, speech recognition engine(s) 220 and/or natural language processing engine(s) 230 may comprise user input processing instructions 118 or other instructions 130 (e.g., mapping instructions, context determination instructions, or other instructions).

[039] Input device(s) 210 may comprise an auditory input device (e.g., microphone), a visual input device (e.g., camera), a tactile input device (e.g., touch sensor), an olfactory input device, a gustatory input device, a keyboard, a mouse, or other input devices. Input received at input device(s) 210 may be provided to speech recognition engine(s) 220 and/or natural language processing engine(s) 230.

[040] Speech recognition engine(s) 220 may process one or more inputs received from input device(s) 210 to recognize one or more words represented by the received inputs. As an example, with respect to auditory input, speech recognition engine(s) 220 may process an audio stream captured by an auditory input device to isolate segments of sound of the audio

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stream. The sound segments (or a representation of the sound segments) are then processed with one or more speech models (e.g., acoustic model, lexicon list, language model, etc.) to recognize one or more words of the received inputs. Upon recognition of the words of received inputs, the recognized words may then be provided to natural language processing engine(s) 230 for further processing. In other examples, natural language processing engine(s) 230 may process one or more other types of inputs (e.g., visual input representing sign language communication, gestures, or other forms of communication) to recognize one or more words represented by the other types of inputs.

[041] Natural language processing engine(s) 230 may receive one or more inputs from input device(s) 210, speech recognition engine(s) 220, application(s) 240, database(s) 132, or other components. As an example, natural language processing engine(s) 230 may process inputs received from input device(s) 210, such as user inputs (e.g., voice, non-voice, etc.), location-based inputs (e.g., GPS data, cell ID, etc.), other sensor data input, or other inputs to determine context information associated with one or more user inputs. As another example, natural language processing engine(s) 230 may obtain grammar information, profile information, context information, or other information from database(s) 132. The obtained information (or context information determined based on inputs from input device(s) 210) may be processed to determine one or more user requests associated with one or more user inputs of a user. In yet another example, natural language processing engine(s) 230 may process one or more recognized words from speech recognition engine(s) 220 and other information (e.g., information from input device(s) 210, application(s) 240, and/or database(s) 132) to determine one or more user requests associated with one or more user inputs of a user.

[042] In an implementation, natural language processing engine(s) 230 may solicit further inputs from a user by responding with a request for more information via output device(s) 250 if, for instance, a user request associated with a user input of a user cannot be determined with sufficient confidence, more information would helpful to process the user request, etc.

[043] In an implementation, upon determination of a user request of a user, natural language processing engine(s) 230 may determine an application 240 suitable for executing

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the user request, and provide the user request to the application for further processing. In one scenario, the application 240 may provide one or more results of the user request to output device(s) 250 for presentation to the user.

[044] In an implementation, the application 240 may provide the results of the user request to natural language processing engine(s) 230 for further processing. As an example, the results of the user request may comprise intermediate results that are provided as a parameter for another user request of the user that is to be executed at another application 240. As such, the natural language processing engine(s) 230 may generate the other user request based on the intermediate results, and provide the other user request to the other application 240. As another example, natural language processing engine(s) 230 may formulate a natural language response based on the results received from the application 240, and provide the natural language response to output device(s) 250 for presentation to the user.

[045] In an implementation, a given application 240 may obtain profile information, account information, or other information from database(s) 132 to authenticate a user before executing a user request of the user. As an example, the application 240 may be part of a given service provider. As such, the application 240 may determine whether the user has access to one or more services associated with the application 240 before executing the user request on behalf of the user.

[046] In an implementation, a given application 240 may obtain content from database(s) 132 and/or content provider(s) 160 to provide one or more results of a user request of a user. In one use case, where the user request comprises a command to play a media item (e.g., song, video clip, movie, etc.), and the application 240 comprises a media stream application, the application 240 may obtain the media item from a given content provider(s) 160 and stream the media item to output device(s) 250 for presentation to the user.

[047] In an implementation, natural language processing engine(s) 230, application(s) 240, or other components may store information in database(s) 132 for later use by natural language processing engine(s) 230, application(s) 240, or other components. As an example, as described in further detail elsewhere herein, natural language processing engine(s) 230 may store information regarding user inputs in database(s) 132 and/or update profile

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information, grammar information, or other information in database(s) 132 based on the information regarding the user inputs.

[048] Profile Management

[049] In an implementation, stored user profile information (e.g., name, address, preferences, etc.) may be utilized to determine the adequacy of available information for responding to a user's natural language input. In one use case, for example, a user may request recommendations for nearby restaurants via a personal assistant application on a user device associated with the user. If, for instance, the user device does not currently have network access (e.g., the user device is not within its service provider's cellular network range), the personal assistant application may utilize the user device's GPS coordinates and pre-stored map data (e.g., map data obtained prior to leaving the cellular network range and stored at the user device) to obtain restaurant information and generate recommendations for the user. However, the user's profile information may indicate that the user is asking for a search of at least a 5 mile radius for restaurants (e.g., a predefined setting specifying the 5 mile radius search), and the pre-stored map data may only allow the personal assistant application to search for restaurants within a 2 mile radius of the user. As such, the personal assistant application may determine that information sufficient to provide an adequate response is not currently accessible. Although the personal assistant application may still generate a response with restaurant recommendations, it may subsequently follow-up with additional and/or updated recommendations when it is able to search for restaurants within at least a 5 mile radius of the user.

[050] In an implementation, profile management instructions 120 may automatically set profile information such as, for example, home and/or work addresses of the user. As an example, the location of a user device of the user may be monitored to determine home and work addresses. In one use case, with user input specifying that a location corresponds to the user's home address, a particular location may be set as the user's home address based on the location being associated with a place at which the user device is located for the vast majority of time (compared to other places). Other profile information may, of course, be automatically (or manually) set, including, for example, preferred brands, preferred shopping

locations, sizes, or other parameters related to products or services, entertainment interests, available devices, historical information relating to the user (e.g., school, cities lived in or visited, etc.), and/or other information relating to the user.

[051] User Interface

[052] In an implementation, user interface instructions 122 may generate a personal assistant interface. The personal assistant interface may provide an interface for the user to interact with system 100. For example, a user may touch/tap a prompt/button provided on the personal assistant interface to initiate interaction with the personal assistant. In an implementation, the personal assistant interface may provide a visual, audio, and/or other mode of response to a natural language query from a user. For example, the personal assistant interface may display a list of nearby preferred shopping locations, or a local map and/or directions for a requested shopping location to the user in response to a corresponding query from the user. In an implementation, the personal assistant interface may provide a visual (or other) representation of the natural language input from the user such as, for example, text transcribing the natural language input. Examples of personal assistant interfaces are illustrated with respect to FIGs. 5, 6, and 7.

[053] In an implementation, the personal assistance interface may be associated with a personal assistant application that manages requests (e.g., queries, commands, etc.) of the user and responses to the user requests. As an example, upon determining a user request intended by a user, the personal assistant application may determine an application that is to process the user request, and provide the user request to the application. In one use case, for instance, if the user request comprises a command to play a song, the personal assistant application may provide the command to a music application. In another use case, if the user request comprises a query for weather information, the personal assistant application may provide the query to a weather application. As another example, the personal assistant application may receive results (related to a user request) from an application selected by personal assistant application to process the user request, and then generate a response to the user request for presentation to the user based on the results. In an implementation, the personal assistant application may comprise one or more of user input processing instructions 118, profile management instructions 120, user interface instructions 122,

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response instructions 140, or other instructions for managing user requests and/or responses to the user requests.

[054] In an implementation, the personal assistant application may comprise an application that is independently operable of other applications that it selects to process user requests and/or from which it receives corresponding results. In one use case, for example, the personal assistant application may be an autonomous application that acts as an interface between users and subsystems (e.g., third party applications) that provide services to the users.

[055] In an implementation, user interface instructions 122 may generate a profile information management interface. The profile information management interface may allow the user to set profile information related to the personal assistant. For example, the profile information management interface enables the user to set default locations, and/or parameters related to products or services preferred by the user. In an implementation, the profile information management interface enables the user to set preferences with respect to operations of the personal assistant, such as, for example, times when active notification is to be suspended (e.g., when in a meeting, when sleeping, etc.).

[056] Information Retrieval

[057] In an implementation, information retrieval instructions 142 may enable computer system 104 to retrieve information for responding to a natural language input associated with a user. For example, in one scenario, a user may ask "Who holds the current world record for the fastest marathon time?" In response, information retrieval instructions 142 may enable computer system 104 (or a personal assistant application thereof) to interface with search engine(s) 180 to retrieve information relating to the query. The retrieved information may be displayed for the user by implementing user interface instructions 122.

[058] In an implementation, information retrieval instructions 142 may enable computer system 104 to determine adequacy of the retrieved information. For example, in the context of Jane Doe's Facebook profile being inaccessible at a given time, information retrieval instructions 142 may enable computer system 104 to determine that the information retrieved while interfacing with content provider 160 (e.g., Facebook) is null (e.g., since Facebook is inaccessible).

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[059] In an implementation, information retrieval instructions 142 may enable computer system 104 to determine that user requested information corresponds to dynamic events, activities, or statuses, and, thus, subject to change. For example, in the context of a query relating to race leaders in a Formula 1 race, information retrieval instructions 142 may enable computer system 104 to determine that a Formula 1 race is currently ongoing and that the race leaders may be different at a subsequent time.

[060] In an implementation, information retrieval instructions 142 may enable computer system 104 to determine that providing an adequate response to a natural language input may require interfacing with search engine(s) 180, or content provider(s) 160 at a subsequent time. For example, in the context of estimated time of travel, information retrieval instructions 142 may enable computer system 104 to retrieve information regarding traffic at a time when the user is departing from his/her current location so as to provide updated information relating to the estimated time of travel.

[061] Session Context Determination

[062] In an implementation, session context determination instructions 144 may enable computer system 104 to determine context of an interactive session between computer system 104 and a user. For example, if a user inquires about a currently ongoing Formula 1 race, and follows up with additional inquiries relating to specific drivers or teams competing in Formula 1 races, session context determination instructions 144 may determine that the interactive session between computer system 104 and the user may be specific to Formula 1 racing. As another example, a user may provide a natural language input relating to his wife's anniversary (e.g., "Remind me to purchase a gift for my wife on January 1"), and proceeds to provide several natural language inputs relating to specific shopping locations (e.g., "How far is Tiffany's from here?"; "How long will it take to reach the nearest Macy's?"; "Which is the best bakery in my 10 mile radius?"; etc.) session context determination instructions 144 may enable computer system 104 to determine that the user is attempting to prepare for his anniversary.

[063] In an implementation, session context determination instructions 144 may enable information retrieval instructions 142 to provide follow-up responses to prior natural language input from a user. For example, a user may provide a natural language input related

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to a query for Jane Doe's birthday. If the only known source of Jane Doe's birthday is Jane Doe's Facebook profile, and the Facebook profile is currently inaccessible, computer system 104 may not be able to provide a response that adequately addresses the user's query at that particular time. At a subsequent time, however, while the user is in a dialog with computer system 104 regarding Formula 1 racing, and Jane Doe's Facebook profile becomes accessible, session context determination instructions 144 may prompt information retrieval instructions 142 to search for a Formula 1 driver having the same birthday as Jane Doe. Information retrieval instructions 142 may then enable computer system 104 to interface with search engine(s) 180 or content provider(s) 160 to retrieve such information and provide it to the user in the context of the dialog relating to Formula 1 racing.

[064] Examples of System Architectures and Configurations

[065] Different system architectures may be used. For example, all or a portion of response instructions 140 (or other instructions described herein) may be executed on a user device. In other words, computing device 110 as illustrated may include a user device operated by the user. In implementations where all or a portion of response instructions 140 are executed on the user device, the user device may interface with search engine(s) 180, and/or content provider(s) 160 to retrieve information, determine a context of an interactive session with a user, and/or perform other functions/operations of response instructions 140.

[066] As another example, all or a portion of response instructions 140 (or other instructions described herein) may be executed on a server device. In other words, computing device 110 as illustrated may include a server device that obtains a user input from a user device operated by the user. In implementations where all or a portion of response instructions 140 are executed on the server device, the server may interface with search engine(s) 180, and/or content provider(s) 160 to retrieve information, determine a context of an interactive session with a user, and/or perform other functions/operations of response instructions 140.

[067] Although illustrated in FIG. 1 as a single component, computer system 104 may include a plurality of individual components (e.g., computer devices) each programmed with at least some of the functions described herein. In this manner, some components of computer system 104 may perform some functions while other components may perform other functions, as would be appreciated. Processor(s) 112 may each include one or more

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physical processors that are programmed by computer program instructions. The various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as processor(s) 112 are programmed to perform the functions described herein.

[068] It should be appreciated that although the various instructions are illustrated in FIG. 1 as being co-located within a single computing device 110, one or more instructions may be executed remotely from the other instructions. For example, some computing devices 110 of computer system 104 may be programmed by some instructions while other computing devices 110 may be programmed by other instructions, as would be appreciated. Furthermore, the various instructions described herein are exemplary only. Other configurations and numbers of instructions may be used, so long as processor(s) 112 are programmed to perform the functions described herein.

[069] The description of the functionality provided by the different instructions described herein is for illustrative purposes, and is not intended to be limiting, as any of instructions may provide more or less functionality than is described. For example, one or more of the instructions may be eliminated, and some or all of its functionality may be provided by other ones of the instructions. As another example, processor(s) 112 may be programmed by one or more additional instructions that may perform some or all of the functionality attributed herein to one of the instructions.

[070] The various instructions described herein may be stored in a storage device 114, which may comprise random access memory (RAM), read only memory (ROM), and/or other memory. The storage device may store the computer program instructions (e.g., the aforementioned instructions) to be executed by processor(s) 112 as well as data that may be manipulated by processor(s) 112. The storage device may comprise floppy disks, hard disks, optical disks, tapes, or other storage media for storing computer-executable instructions and/or data.

[071] The various components illustrated in FIG. 1 may be coupled to at least one other component via a network 102, which may include any one or more of, for instance, the Internet, an intranet, a PAN (Personal Area Network), a LAN (Local Area Network), a WAN (Wide Area Network), a SAN (Storage Area Network), a MAN (Metropolitan Area Network), a

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wireless network, a cellular communications network, a Public Switched Telephone Network, and/or other network. In FIG. 1 and other drawing Figures, different numbers of entities than depicted may be used. Furthermore, according to various implementations, the components described herein may be implemented in hardware and/or software that configure hardware.

[072] User device(s) may include a device that can interact with computer system 104 through network 102. Such user device(s) may include, without limitation, a tablet computing device, a smartphone, a laptop computing device, a desktop computing device, a network-enabled appliance such as a "Smart" television, a vehicle computing device, and/or other device that may interact with computer system 104.

[073] The various databases 132 described herein may be, include, or interface to, for example, an Oracle™ relational database sold commercially by Oracle Corporation. Other databases, such as Informix™, DB2 (Database 2) or other data storage, including file-based (e.g., comma or tab separated files), or query formats, platforms, or resources such as OLAP (On Line Analytical Processing), SQL (Structured Query Language), a SAN (storage area network), Microsoft Access™, MySQL, PostgreSQL, HSpace, Apache Cassandra, MongoDB, Apache CouchDB™, or others may also be used, incorporated, or accessed. The database may comprise one or more such databases that reside in one or more physical devices and in one or more physical locations. The database may store a plurality of types of data and/or files and associated data or file descriptions, administrative information, or any other data. The database(s) 132 may be stored in storage device 114 and/or other storage that is accessible to computer system 104.

[074] Example Flow Diagrams

[075] The following flow diagrams describe operations that may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

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[076] FIG. 3 illustrates a flow diagram for a method of providing follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention. The various processing data flows depicted in FIG. 3 (and in the other drawing figures) are described in greater detail herein. The described operations may be accomplished using some or all of the system components described in detail above and, in some implementations, various operations may be performed in different sequences and various operations may be omitted. Additional operations may be performed along with some or all of the operations shown in the depicted flow diagrams. One or more operations may be performed simultaneously. Accordingly, the operations as illustrated (and described in greater detail below) are exemplary by nature and, as such, should not be viewed as limiting.

[077] In an operation 301, a natural language input associated with a user may be received at a user device. In an operation 302, the natural language input may be processed to determine a user request related to the natural language utterance. As an example, a user input comprising a natural language utterance may be received and processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine the user request related to the natural language utterance.

[078] In an operation 303, a determination of whether information sufficient for providing an adequate response to the user request (or the natural language input) is currently accessible may be effectuated.

[079] In an operation 311, upon determination that information sufficient for providing an adequate response to the user request of the user is currently not accessible (or not available), a first response may be provided indicating that a follow-up response will be provided. The first response may be, for example, a visual or audio output indicating that requested information is currently not accessible and that the requested information will be provided when it becomes available. In one implementation, whatever information is available may be provided to the user as part of the first response along with a message indicating that more information is forthcoming at a subsequent time as it becomes available. For example, a user may provide a query such as: “Who won today’s Formula 1 race?” If the

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race is still ongoing (i.e., insufficient information to respond to the query), a response such as: "Today's Formula 1 race is not yet finished, results will be provided when the race is over" may be provided.

[080] In an operation 312, more information for providing an adequate response to the user request may be requested at a subsequent time such as, for example, when a resource (e.g., a Facebook profile) becomes available or accessible. The system request for the information (for providing an adequate response) may, for example, be performed without a subsequent user request for such information after it is initially determined that such information is currently inaccessible.

[081] In an operation 313, first information sufficient for providing adequate response to the user is received, e.g., from the newly available or accessible resource (e.g., a Facebook profile).

[082] In an operation 314, a second response to the user request may be provided to the user based on the first information.

[083] In an operation 321, upon determination that information sufficient for providing an adequate response is currently accessible (or available), such information may be obtained, and a response to the user request may be generated (and provided to the user) based on the obtained information. For example, when a user inquires about Jane Doe's birthday, and a database storing information regarding Jane Doe's birthday is accessible, the information may be obtained and provided to the user.

[084] In an operation 322, additional information relating to the user request may be requested at a subsequent time. The request for additional information may, for example, be performed without a subsequent user request for the additional information.

[085] In an operation 323, additional information relating to the user request may be received (e.g., from a search engine or a content provider). For example, in the context of Jane Doe's birthday coinciding with Nicki Lauda's birthday, this additional information may be received, for example, from a Wikipedia entry about Nicki Lauda.

[086] In an operation 324, a second response based on the additional information relating to the user request may be provided at a subsequent time (e.g., when the user is in a dialog with the personal assistant about Formula 1 racing).

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[087] FIG. 4 illustrates another flow diagram for a method of providing follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention. In an operation 401, a natural language input of a user may be received. In an operation 402, the natural language input may be processed to determine a user request related to the natural language input. As an example, a user input comprising a natural language utterance may be received and processed by a speech recognition engine to recognize one or more words of the natural language utterance. The recognized words may then be processed, along with context information associated with the user, by a natural language processing engine to determine the user request related to the natural language utterance.

[088] In an operation 403, information sufficient for providing an adequate response to the user request may be requested.

[089] In an operation 404, one or more subsequent natural language inputs may be received from the user. In an implementation, the subsequent natural language inputs may be received and processed irrespective of whether information sufficient for providing an adequate response to the user request has been received (responsive to the system request for information sufficient for providing an adequate response to the user request) and/or whether a response to the user request has been provided to the user. As an example, asynchronous full-duplex communication between the user and a personal assistant application (e.g., hosted on computing system 104) may be enabled to facilitate receipt and processing of natural language inputs, and system responses to user inputs.

[090] In an operation 405, first information sufficient for providing an adequate response to the user request may be received (e.g., after receiving the subsequent natural language inputs, after providing responses to the subsequent natural language inputs, etc.).

[091] In an operation 406, a response to the user request may be provided based on the first information. In an implementation, the response based on the first information is provided subsequent to providing a response to the subsequent natural language inputs.

[092] Example Screenshots

[093] FIG. 5 illustrates a screenshot 500 of a user interface which provides a response indicating that a follow-up response will be provided, according to an implementation of the

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invention. The described screenshots may be accomplished using some or all of the system components described in detail above. With respect to screenshot 500, a user may provide a natural language input (e.g., natural language utterance or other input) indicating a user request for Jane Doe's birthday. In response to the natural language input, an application associated with the depicted user interface (e.g., a personal assistant application) may provide a first response to the natural language input from the user. As an example, the first response may be indicative of insufficient information for providing an adequate response to the natural language input. If, for example, the best resource (e.g., a Facebook profile) for obtaining information for providing a response to the natural language input is inaccessible (e.g., due to resource downtime), a response indicating that sufficient information related to the user's request is not currently available, and that an adequate response will be provided when information becomes available. As depicted in screenshot 500, the response to the user request may include a reason for insufficient information and an indication that a follow-up response will be provided.

[094] FIG. 6 illustrates a screenshot 600 of a user interface which provides follow-up responses to prior natural language inputs associated with a user, according to an implementation of the invention. The described screenshots may be accomplished using some or all of the system components described in detail above. With respect to screenshot 600, continuing the Jane Doe birthday example in FIG. 5, a follow-up response may be provided at a later time (e.g., when an available source storing information regarding Jane Doe's birthday is found). As indicated in screenshot 600, the follow-up response (e.g., "Jane Doe's birthday is October 2. Would you like me to set a reminder?") may be provided after receiving one or more subsequent natural language inputs from the user and/or providing responses to the subsequent user inputs.

[095] FIG. 7 illustrates a screenshot 700 of a user interface which provides follow-up responses to prior natural language inputs associated with a user in between unrelated subsequent user inputs and/or responses to the subsequent user inputs. The described screenshots may be accomplished using some or all of the system components described in detail above. With respect to screenshot 700, a user may interact with the system (or a personal assistant application thereof) by providing a number of natural language inputs,

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which results in immediate system responses that adequately addresses the inputs. In some cases, updated information relating to the user inputs may be available at a subsequent time during this interaction between the user and the system. In such cases, the updated information (e.g., driver positions in a race) may be provided (e.g., in the form of follow-up responses) in real-time to the user as it becomes available, without a prompt or subsequent related input from the user. In other cases, the updated information (e.g., current estimated time to the user's home) may be provided based on a subsequent natural language input (e.g., "I'm leaving for home") from the user.

[096] Other implementations, uses and advantages of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. The specification should be considered exemplary only, and the scope of the invention is accordingly intended to be limited only by the following claims.

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What is claimed is:

1. A method for providing follow-up responses for prior natural language inputs of a user, the method being implemented on a computer system having one or more physical processors programmed with computer program instructions which, when executed, perform the method, the method comprising:

receiving, at the computer system, a natural language input associated with a user;

determining, by the computer system, whether information sufficient for providing an adequate response to the natural language input is currently accessible to the computer system;

providing, by the computer system, based on a determination that information sufficient for providing an adequate response to the natural language input is not currently accessible, a first response to the natural language input that indicates that a follow-up response will be provided;

receiving, at the computer system, first information sufficient for providing an adequate response to the natural language input; and

providing, by the computer system, a second response to the natural language input based on the first information.

2. The method of claim 1, wherein the second response is provided to the user in real-time when the first information is received.

3. The method of claim 1, wherein providing the second response to the natural language input comprises providing the second response during an interactive session between the computer system and the user.

4. The method of claim 3, further comprising:

determining, by the computer system, context information associated with the interactive session between the user and the computer system,

wherein providing the second response comprises providing the second response based on the first information and the context information.

5. The method of claim 1, further comprising:

receiving, at the computer system, one or more subsequent natural language inputs associated with the user after the receipt of natural language input; and

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providing, by the computer system, one or more subsequent responses to the one or more subsequent natural language inputs.

6. The method of claim 5, wherein the one or more subsequent natural language inputs are received after the providing of the first response.

7. The method of claim 5, wherein the second response is provided after the providing of the one or more subsequent responses.

8. A system for providing follow-up responses for prior natural language inputs of a user, the system comprising:

one or more physical processors programmed with computer program instructions which, when executed, cause the one or more physical processors to:

receive a natural language input associated with a user;

determine whether information sufficient for providing an adequate response to the natural language input is currently accessible to the system;

provide, by the computer system, based on a determination that information sufficient for providing an adequate response to the natural language input is not currently accessible, a first response to the natural language input that indicates that a follow-up response will be provided;

receive first information sufficient for providing an adequate response to the natural language input; and

provide a response to the natural language input based on the first information.

9. The system of claim 8, wherein the follow-up response is provided to the user in real-time when the first information is received.

10. The system of claim 8, wherein providing the follow-up response to the natural language input comprises providing the second response in an interactive session between the computer system and the user.

11. The system of claim 10, wherein the computer program instructions further cause the one or more physical processors to:

determine context information associated with the interactive session between the computer system and the user,

wherein providing the second response comprises providing the second response

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based on the first information and the context information.

12. The system of claim 8, wherein the computer program instructions further cause the one or more physical processors to:

receive one or more subsequent natural language inputs associated with the user after the receipt of the natural language input; and

provide one or more subsequent responses to the one or more subsequent natural language inputs.

13. The system of claim 12, wherein the one or more subsequent inputs are received after the providing of the first response.

14. The system of claim 12, wherein the second response is provided after the providing of the one or more subsequent responses.

15. A method for providing follow-up responses for prior natural language inputs of a user, the method being implemented on a computer system having one or more physical processors programmed with computer program instructions which, when executed, perform the method, the method comprising:

receiving, at the computer system, a natural language input associated with a user;

receiving, at the computer system, one or more subsequent natural language inputs associated with the user after the receipt of the natural language input;

receiving, at the computer system, first information sufficient for providing an adequate response to the natural language input; and

providing, by the computer system, a response to the first natural language input based on the first information after the receipt of the one or more subsequent natural language inputs.

16. The method of claim 15, further comprising:

determining, by the computer system, whether information sufficient for providing an adequate response to the natural language input is currently accessible to the computer system; and

providing, by the computer system, based on a determination that information sufficient for providing an adequate response to the natural language input is not currently accessible, a first response to the natural language input that indicates that a follow-up

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response will be provided.

17. The method of claim 15, further comprising:

providing, by the computer system, one or more responses to the one or more subsequent natural language inputs,

wherein the response to the natural language input is provided after the providing of the one or more responses to the one or more subsequent natural language inputs.

18. The method of claim 15, further comprising:

determining, by the computer system, context information associated with an interactive session between the computer system and the user,

wherein providing the response comprises providing the response based on the first information and the context information.

19. The method of claim 15, wherein the response is provided to the user in real-time when the first information is received.

20. A system for providing follow-up responses for prior natural language inputs of a user, the system comprising:

one or more physical processors programmed with computer program instructions which, when executed, cause the one or more physical processors to:

receive a natural language input associated with a user;

receive one or more subsequent natural language inputs associated with the user after the receipt of the natural language input;

receive first information sufficient for providing an adequate response to the natural language input; and

provide a response to the natural language input based on the first information after the receipt of the one or more subsequent natural language inputs.

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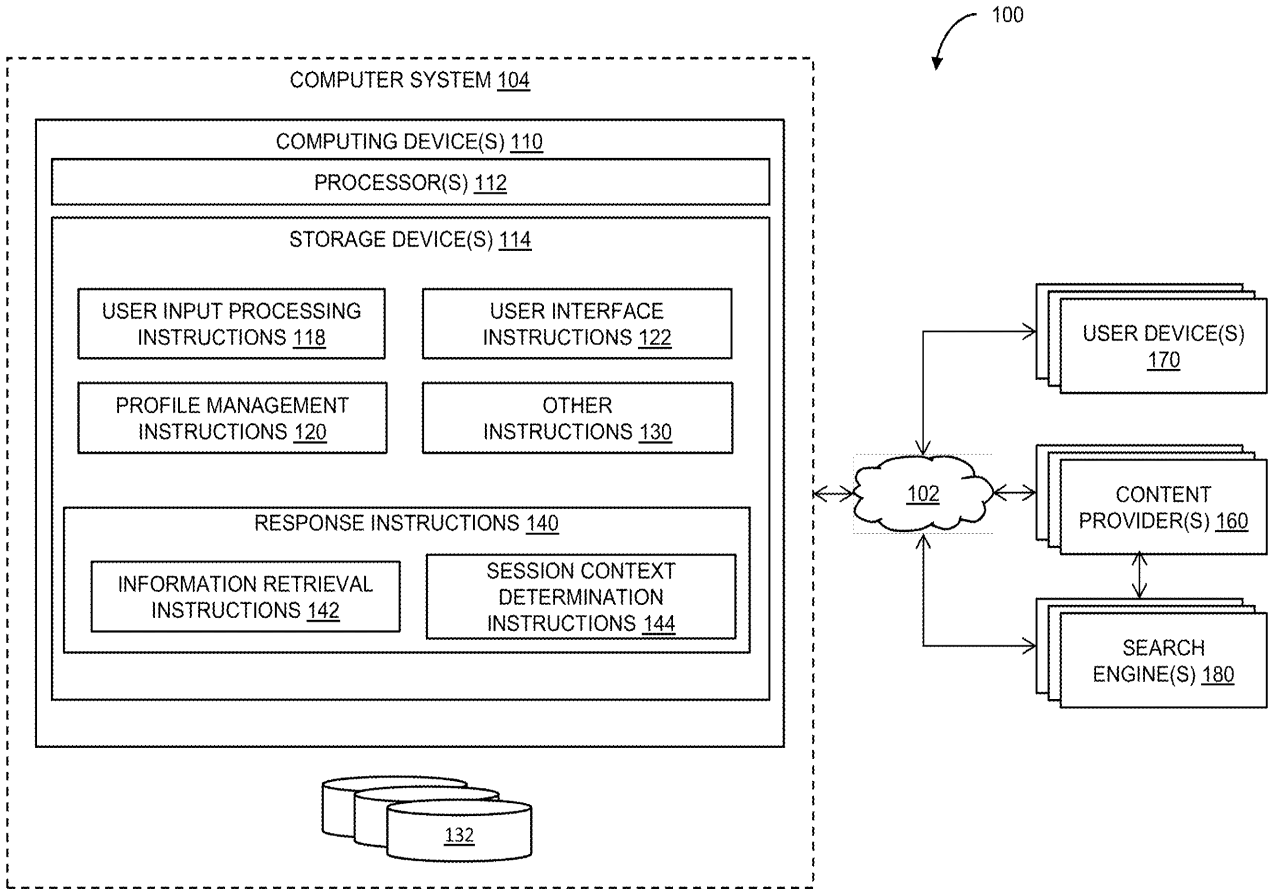

100
COMPUTER SYSTEM 104
COMPUTING DEVICE(S) 110
PROCESSOR(S) 112
STORAGE DEVICE(S) 114
USER INPUT PROCESSING INSTRUCTIONS 118
USER INTERFACE INSTRUCTIONS 122
PROFILE MANAGEMENT INSTRUCTIONS 120
OTHER INSTRUCTIONS 130
RESPONSE INSTRUCTIONS 140
INFORMATION RETRIEVAL INSTRUCTIONS 142
SESSION CONTEXT DETERMINATION INSTRUCTIONS 144
132
102
USER DEVICE(S) 170
CONTENT PROVIDER(S) 160
SEARCH ENGINE(S) 180

FIG. 1

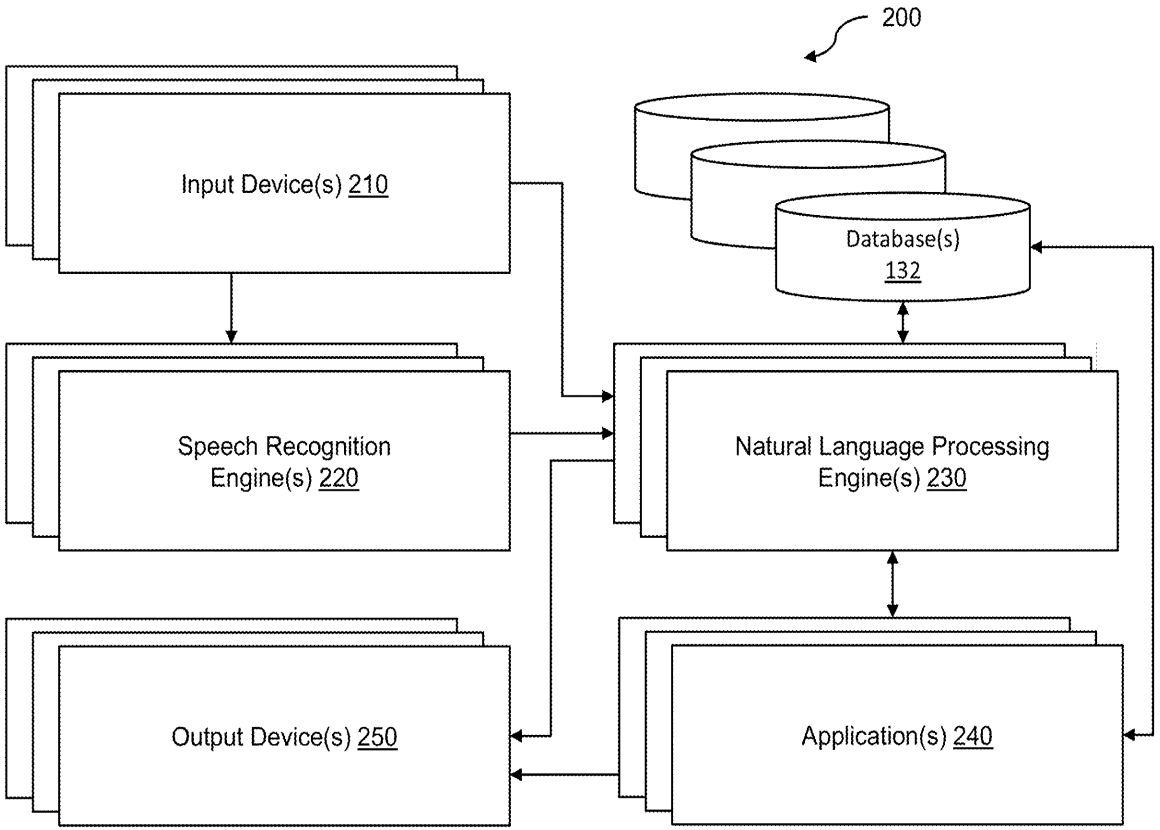

200
Input Device(s) 210
Database(s) 132
Speech Recognition Engine(s) 220
Natural Language Processing Engine(s) 230
Output Device(s) 250
Application(s) 240

FIG. 2

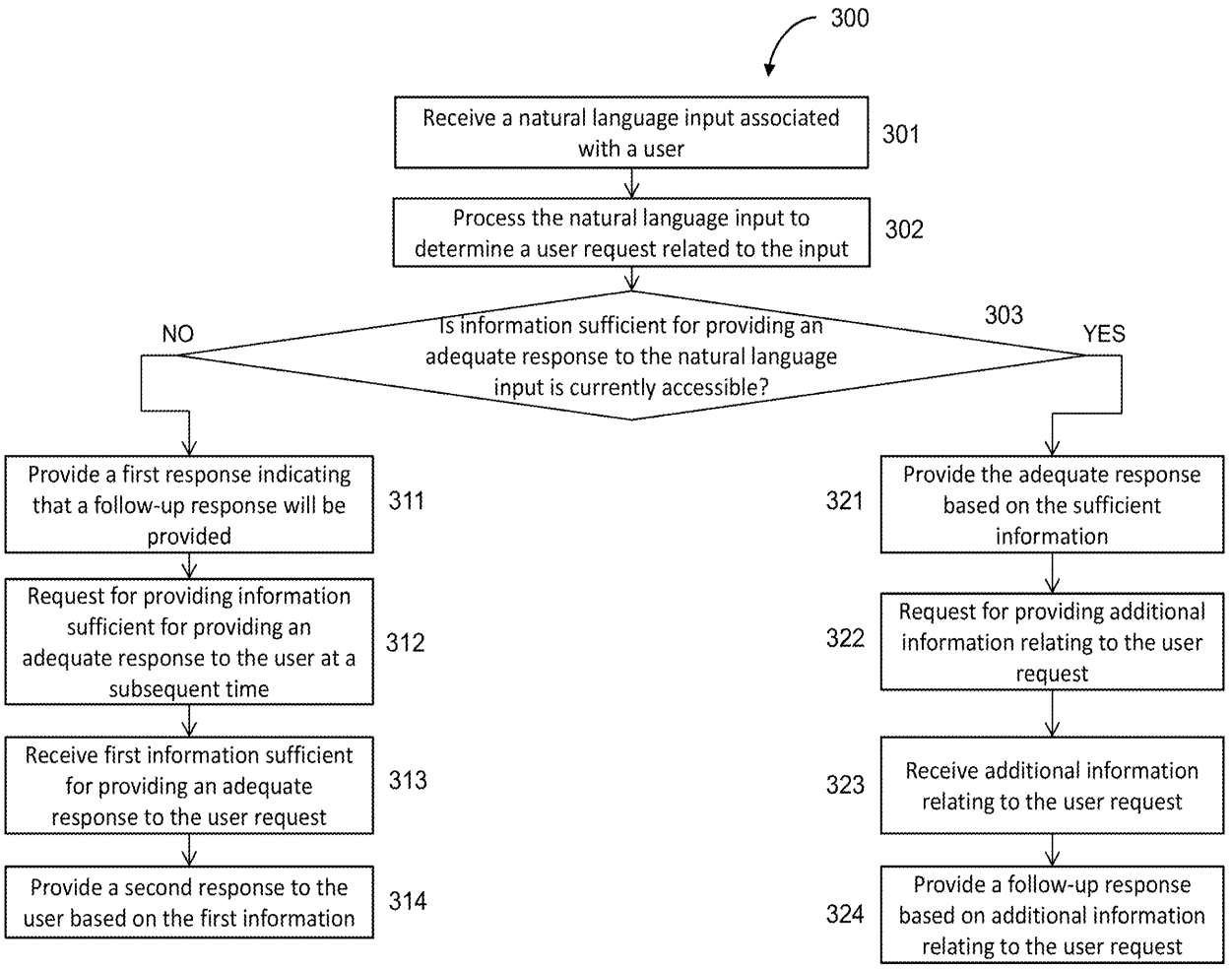

300
Receive a natural language input associated with a user
301
Process the natural language input to determine a user request related to the input
302
Is information sufficient for providing an adequate response to the natural language input is currently accessible?
303
NO
YES
Provide a first response indicating that a follow-up response will be provided
311
Request for providing information sufficient for providing an adequate response to the user at a subsequent time
312
Receive first information sufficient for providing an adequate response to the user request
313
Provide a second response to the user based on the first information
314
Provide the adequate response based on the sufficient information
321
Request for providing additional information relating to the user request
322
Receive additional information relating to the user request
323
Provide a follow-up response based on additional information relating to the user request
324

FIG. 3

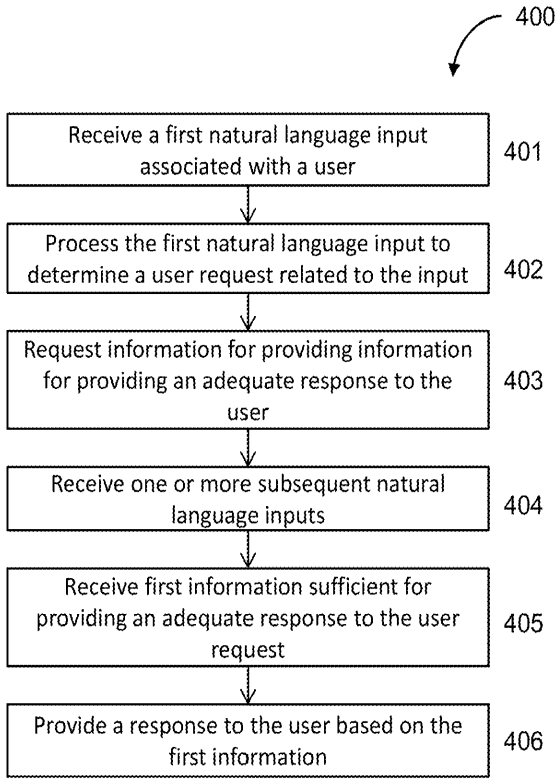


FIG. 4

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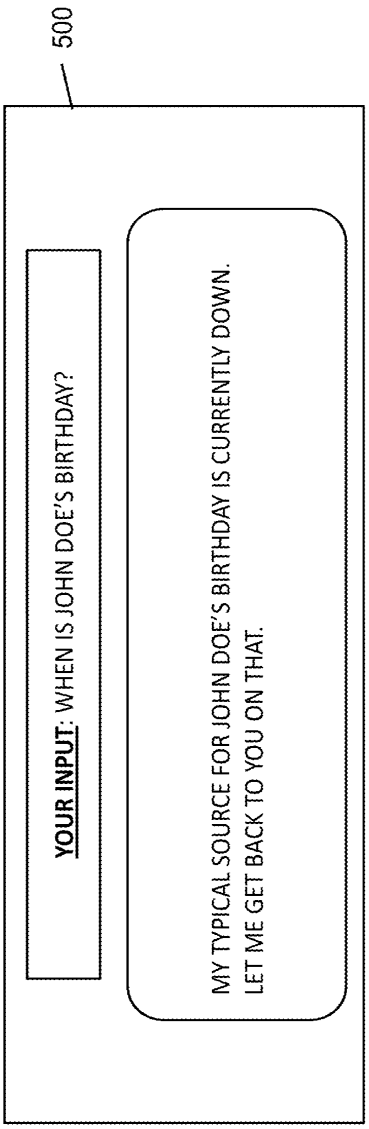

500
YOUR INPUT: WHEN IS JOHN DOE'S BIRTHDAY?
MY TYPICAL SOURCE FOR JOHN DOE'S BIRTHDAY IS CURRENTLY DOWN.
LET ME GET BACK TO YOU ON THAT.

FIG. 5

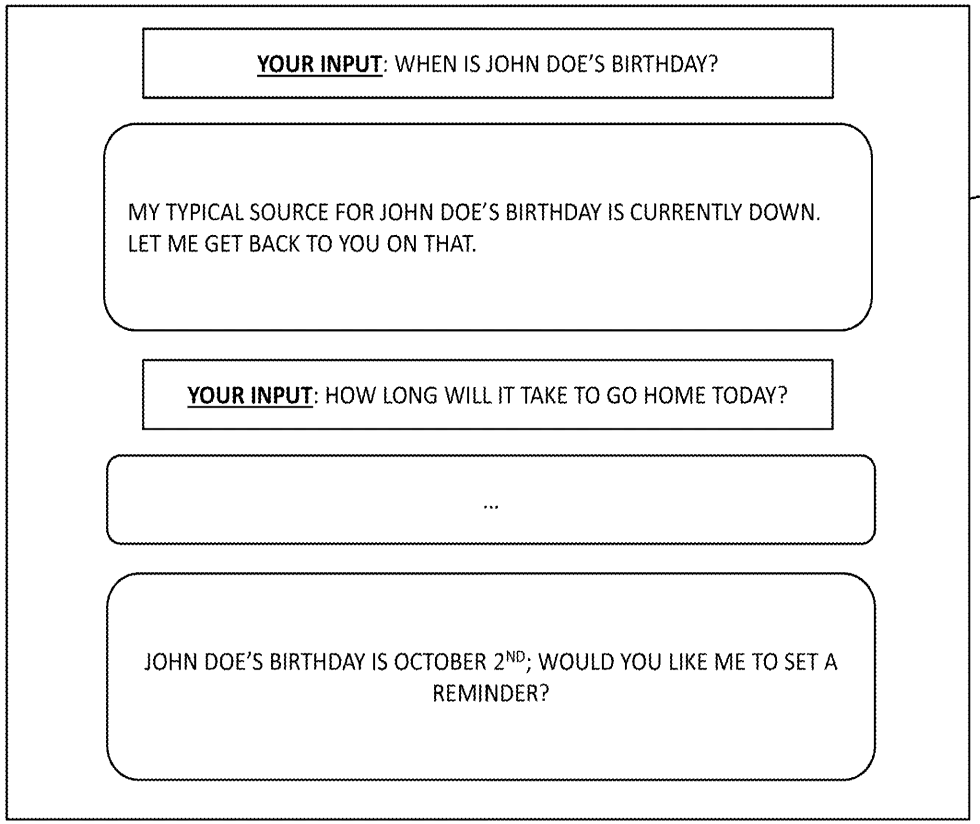


FIG. 6

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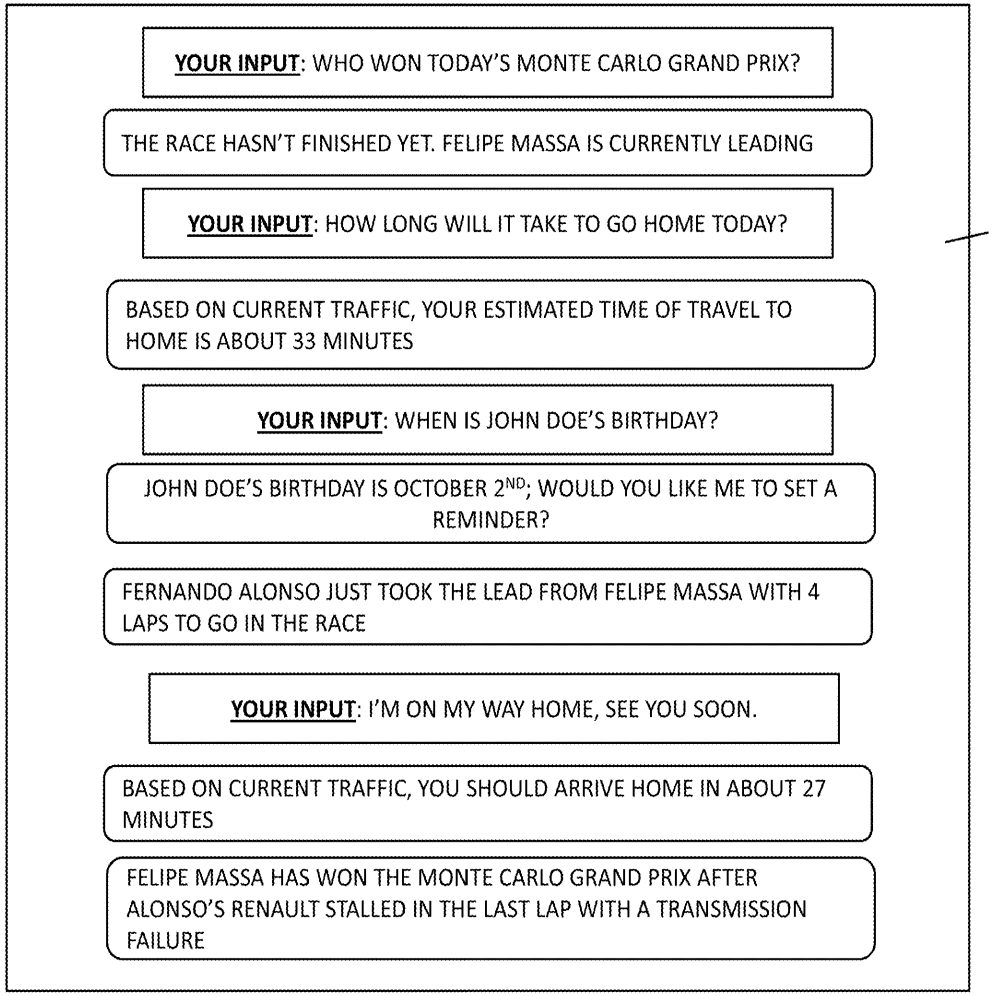


FIG. 7

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Page 1346

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 15/55659

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 17/27 (2015.01)
CPC - G06F 17/2785; G06F 17/274; G06F 17/271
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
CPC: G06F 17/2785; G06F 17/274; G06F 17/271; IPC(8): G06F 17/27 (2015.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 704/9; 704/257; 704231; CPC: G06F 17/2785; G06F 17/274; G06F 17/271; G06F 17/277; G06F 17/2755; IPC(8): G06F 17/27 (2015.01) (keyword limited, terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, IEEE; Search Terms: natural language; follow-up question, query; user response; interactive system; expert system; parsing, interpreting; ambiguity; rapid, fast, real-time, realtime; question-response

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007/0050191 A1 (Weider et al.) 01 March 2007 (01.03.2007), entire document especially paras [0012], [0028], [0033]	1 - 20
A	US 8,346,563 B1 (Hjelm et al.) 01 January 2013 (01.01.2013), entire document	1 - 20
A	US 6,570,555 B1 (Prevost et al.) 27 May 2003 (27.05.2003), entire document	1 - 20
A	US 2007/0033005 A1 (Cristo et al.) 08 February 2007 (08.02.2007), entire document	1 - 20
A	US 5,369,575 A (Lamberti et al.) 29 November 1994 (29.11.1994), entire document	1 - 20

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 December 2015 (06.12.2015)	11 JAN 2016
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (January 2015)

Electronic Acknowledgement Receipt

EFS ID:	25905967
Application Number:	14691445
International Application Number:	
Confirmation Number:	8351
Title of Invention:	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE
First Named Inventor/Applicant Name:	Larry BALDWIN
Customer Number:	133759
Filer:	Hean Lee Koo/Susan Trader
Filer Authorized By:	Hean Lee Koo
Attorney Docket Number:	45HV-218492
Receipt Date:	27-MAY-2016
Filing Date:	20-APR-2015
Time Stamp:	11:46:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	45HV-218492_IDS_1449.pdf	14861 a70c79dab12ee8994789acd7e1e327603ce39244	no	2

Warnings:	
Information:	

This is not an USPTO supplied IDS fillable form					
2	Foreign Reference	CITE-21--JPW2008058465.pdf	1093829 b49504593360eab19d6ac505a9f950be55f6a9a3	no	23
Warnings:					
Information:					
3	Foreign Reference	CITE-22--WO2016044290.pdf	2192487 2e9f3459a4874a0ef11a56bea70b4377006ed53b	no	49
Warnings:					
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4	Foreign Reference	CITE-23--WO2016044316.pdf	1876224 10f91bdcb462ace34a7d641c982a228184b0c552	no	42
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5	Foreign Reference	CITE-24--WO2016044319.pdf	1909604 908f3345b1a61bbf24114032c7b7b918f12b20b0	no	43
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Warnings:					
Information:					
7	Foreign Reference	CITE-26--WO2016061309.pdf	1558198 9bf793449a02527a9c40dcbdeab3b64275d347e3	no	37
Warnings:					
Information:					
			Total Files Size (in bytes):	10883151	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	14/691,445
	Filing Date	4/20/2015
	First Named Inventor	Larry BALDWIN
	Art Unit	2658
	Client Number	45HV
Page 1 of 3	**Matter Number**	218492

U.S. PATENT DOCUMENTS					
Initials	**Cite No.**	**Document Number**	**Issue/Publication Date**	**First Named Inventor**	**T**
	1	20020029186	03/07/2002	Roth	
	2	20030187643	10/02/2003	VanThong	
	3	20040133793	07/08/2004	Ginter	
	4	20060100851	05/11/2006	Schonebeck	
	5	20060242017	10/26/2006	Libes	
	6	20060253281	11/09/2006	Letzt	
	7	20070112555	05/17/2007	Lavi	
	8	20070124057	05/31/2007	Prieto	
	9	20080104071	05/01/2008	Pragada	
	10	20080294437	11/27/2008	Nakano	
	11	20090024476	01/22/2009	Baar	
	12	20090248605	10/01/2009	Mitchell	
	13	20090265163	10/22/2009	Li	
	14	20090287680	11/19/2009	Paek	
	15	20090304161	12/10/2009	Pettyjohn	
	16	20110106527	05/05/2011	Chiu	
	17	20110119049	05/19/2011	Ylonen	
	18	20120046935	02/23/2012	Nagao	
	19	20120150620	06/14/2012	Mandyam	
	20	20120239498	09/20/2012	Ramer	
	21	20130006734	01/03/2013	Ocko	
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	23	20130254314	09/26/2013	Chow	
	24	20130311324	11/21/2013	Stoll	
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	26	20140236575	08/21/2014	Tur	
	27	20150348544	12/03/2015	Baldwin	
	28	20150364133	12/17/2015	Freeman	
	29	20160049152	02/18/2016	Kennewick	
	30	5265065	11/23/1993	Turtle	

Examiner Signature		**Date Considered**	
Examiner: Please initial if citation considered, whether or not citation is in conformance with MPEP Section 609. Please draw a line through the citation if it is not in conformance and it is not considered. Please include a copy of this form with the next communication to the applicant.			

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	14/691,445
	Filing Date	4/20/2015
	First Named Inventor	Larry BALDWIN
	Art Unit	2658
	Client Number	45HV
Page 2 of 3	**Matter Number**	218492

U.S. PATENT DOCUMENTS					
Initials	**Cite No.**	**Document Number**	**Issue/Publication Date**	**First Named Inventor**	**T**
	31	5369575	11/29/1994	Lamberti	
	32	6073098	06/06/2000	Buchsbaum	
	33	6567805	05/20/2003	Johnson	
	34	6816830	11/09/2004	Kempe	
	35	7415100	08/19/2008	Cooper	
	36	7454368	11/18/2008	Stillman	
	37	7672931	03/02/2010	Hurst-Hiller	
	38	7697673	04/13/2010	Chiu	
	39	8032383	10/04/2011	Bhardwaj	
	40	8180037	05/15/2012	Delker	
	41	8346563	01/01/2013	Hjelm	
	42	8503995	08/06/2013	Ramer	
	43	8849791	09/30/2014	Hertschuh	
	44	9009046	04/14/2015	Stewart	
	45	9037455	05/19/2015	Faaborg	
	46	9269097	02/23/2016	Freeman	

FOREIGN PATENT DOCUMENTS					
Initials	**Cite No.**	**Document Number**	**Publication Date**	**Country**	**T**
	47	2001071289	03/21/2001	JP	

Examiner Signature		**Date Considered**	
Examiner: Please initial if citation considered, whether or not citation is in conformance with MPEP Section 609. Please draw a line through the citation if it is not in conformance and it is not considered. Please include a copy of this form with the next communication to the applicant.			

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	14/691,445
	Filing Date	4/20/2015
	First Named Inventor	Larry BALDWIN
	Art Unit	2658
	Client Number	45HV
Page 3 of 3	**Matter Number**	218492

GENERAL
Pursuant to 37 C.F.R. 1.97 and 1.98 and to the duty of disclosure set forth in 37 C.F.R. 1.56, the Examiner in charge of the above-identified application is requested to consider and make of record the references listed herewith. A copy of each listed reference, other than U.S. patents/applications and references cited in a parent application, is enclosed. Although the information submitted herewith may be "material" to the Examiner's consideration of the subject application, this submission is not intended to constitute an admission that such information is "prior art" as to the claimed invention. In accordance with 37 C.F.R. 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made.

TIMING
In accordance with 37 CFR 1.97(b), this Information Disclosure Statement is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53(d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits; or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

CERTIFICATION STATEMENT
No certification statement is required. This Information Disclosure Statement is being filed in accordance with 37 CFR 1.97(b).

FEE
No fee is required. This Information Disclosure Statement is being filed in accordance with 37 CFR 1.97(b). If necessary, the Director is hereby authorized to charge or credit Deposit Account No. 501067 for any additional fees, or any underpayment or credit for overpayment in connection herewith. Please reference attorney docket number 45HV-218492 for any such charge or credit.

SIGNATURE			
Signature	/ Hean L. Koo /	Date	2016-02-29
Name	Hean L. Koo	Registration Number	61,214

SyncIDS.com

Espacenet

Bibliographic data: JP2001071289 (A) — 2001-03-21

DEVICE AND METHOD FOR INFORMATION PROCESSING AND PROGRAM STORING MEDIUM

Inventor(s): KOJIMA KIYONOBU; KATO YASUHIKO; YONEKURA SHUJI; FUJIMURA SATOSHI; SASAI TAKASHI; FUJISAWA NAOKI; OI JUNJI; NOMA TSUNENORI; YOKOO NAOHIRO; GOTO FUTOSHI ± (KOJIMA KIYONOBU, ; KATO YASUHIKO, ; YONEKURA SHUJI, ; FUJIMURA SATOSHI, ; SASAI TAKASHI, ; FUJISAWA NAOKI, ; OI JUNJI, ; NOMA TSUNENORI, ; YOKOO NAOHIRO, ; GOTO FUTOSHI)

Applicant(s): SONY CORP ± (SONY CORP)

Classification: **- international:** ***A63H11/00; B25J13/00; G06F3/01; G06F3/16; G10L15/00;*** (IPC1-7): B25J13/00; G10L15/00

- cooperative:

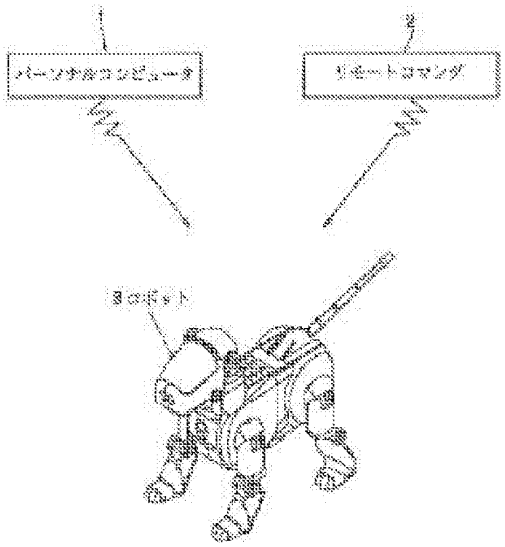
Application number: JP19990249568 19990903

Priority/related number(s): JP19990249568 19990903

Abstract of JP2001071289 (A)

PROBLEM TO BE SOLVED: To issue an instruction for a robot and an electric pet with the same operation. SOLUTION: A personal computer 1 displays an electronic pet, to provide an instruction and provide an instruction for a robot 3 as well. An instruction issued while the electronic pet is displayed on the personal computer 1 is directed to the electronic pet, an instruction issued while the electronic pet is covered with a cap, and is not visible is directed to the robot 3. A user can see the displayed state to recognize whether his instruction to be issued will be directed to the electronic pet or to the robot 3, and provide a necessary instruction as an audio signal for the personal computer 1. If an instruction corresponding to the result for analyzing the audio signal is directed to the robot 3, a signal corresponding to the analyzed result is transmitted to the robot 3. If the instruction is directed to the electronic pet, the display is changed according to the instruction.

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Ｇ０６Ｆ　3/00	６０１	Ｇ０６Ｆ　3/00	６０１	５Ｄ０１５
3/16	３２０	3/16	３２０Ｂ	５Ｅ５０１
	３３０		３３０Ｚ	

審査請求　未請求　請求項の数６　ＯＬ　（全 16 頁）　最終頁に続く

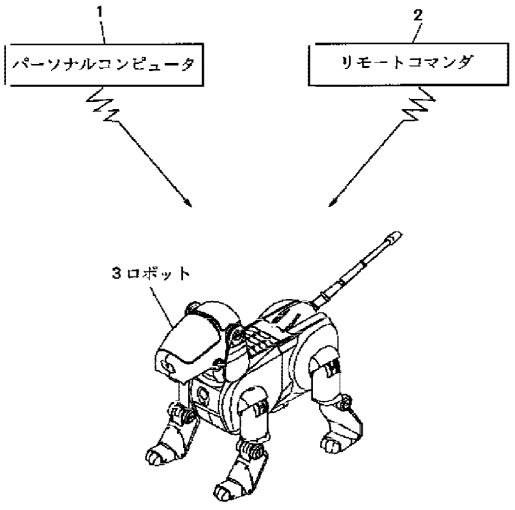
(21)出願番号　特願平11－249568
(22)出願日　平成11年９月３日(1999.9.3)

(71)出願人　000002185
ソニー株式会社
東京都品川区北品川６丁目７番35号
(72)発明者　小島　清信
東京都品川区北品川６丁目７番35号　ソニー株式会社内
(72)発明者　加藤　靖彦
東京都品川区北品川６丁目７番35号　ソニー株式会社内
(74)代理人　100082131
弁理士　稲本　義雄

最終頁に続く

(54)【発明の名称】　情報処理装置および方法、並びにプログラム格納媒体

(57)【要約】
【課題】　ロボットや電子ペットに同一の操作で指示を出す。
【解決手段】　パーソナルコンピュータ１は、電子ペットを表示し、指示を出せると共に、ロボット３に対しても指示を出せる。パーソナルコンピュータ１に電子ペットが表示されているときに出される指示は、電子ペットに対してであり、その電子ペットに蓋が被され、見えなくなっているときに出される指示は、ロボット３に対してである。ユーザは、表示されている状態を見て、今、指示を出したらロボット３に対してか、電子ペットに対してかを認識し、所望の指示を音声信号として、パーソナルコンピュータ１に入力する。その音声信号を解析した結果に対応する指示が、ロボット３に対して出されたものであれば、その解析結果に対応する信号が、ロボット３に対して送信され、電子ペットに出されたものであれば、その表示が指示にあった形に変えられる。



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【特許請求の範囲】
【請求項１】　仮想空間において飼育される仮想生命オブジェクトに対して、または、現実空間において飼育される疑似生命オブジェクトに対して、所定の動作をさせるコマンドを入力する入力手段と、
前記入力手段により入力されるコマンドが、前記仮想生命オブジェクトに対するものであるか、前記疑似生命オブジェクトに対するものであるかを切り換える切り換え手段と、
前記入力手段により入力された前記コマンドが、前記仮想生命オブジェクトに対するものである場合、前記コマンドに対応する前記仮想生命オブジェクトの表示を制御する表示制御手段と、
前記入力手段により入力された前記コマンドが、前記疑似生命オブジェクトに対するものである場合、前記コマンドに対応する信号を前記疑似生命オブジェクトに対して送信する送信手段とを含むことを特徴とする情報処理装置。
【請求項２】　前記入力手段は、音声信号で前記コマンドを入力することを特徴とする請求項１に記載の情報処理装置。
【請求項３】　前記送信手段により送信される前記信号は、音階信号であることを特徴とする請求項１に記載の情報処理装置。
【請求項４】　前記仮想生命オブジェクトおよび前記疑似生命オブジェクトの名称は、ユーザにより付けられることを特徴とする請求項１に記載の情報処理装置。
【請求項５】　仮想空間において飼育される仮想生命オブジェクトに対して、または、現実空間において飼育される疑似生命オブジェクトに対して、所定の動作をさせるコマンドを入力する入力ステップと、
前記入力ステップの処理で入力されるコマンドが、前記仮想生命オブジェクトに対するものであるか、前記疑似生命オブジェクトに対するものであるかを切り換える切り換えステップと、
前記入力ステップの処理で入力された前記コマンドが、前記仮想生命オブジェクトに対するものである場合、前記コマンドに対応する前記仮想生命オブジェクトの表示を制御する表示制御ステップと、
前記入力ステップの処理で入力された前記コマンドが、前記疑似生命オブジェクトに対するものである場合、前記コマンドに対応する信号を前記疑似生命オブジェクトに対して送信する送信ステップとを含むことを特徴とする情報処理方法。
【請求項６】　仮想空間において飼育される仮想生命オブジェクトに対して、または、現実空間において飼育される疑似生命オブジェクトに対して、所定の動作をさせるコマンドを入力する入力ステップと、
前記入力ステップの処理で入力されるコマンドが、前記仮想生命オブジェクトに対するものであるか、前記疑似生命オブジェクトに対するものであるかを切り換える切り換えステップと、
前記入力ステップの処理で入力された前記コマンドが、前記仮想生命オブジェクトに対するものである場合、前記コマンドに対応する前記仮想生命オブジェクトの表示を制御する表示制御ステップと、
前記入力ステップの処理で入力された前記コマンドが、前記疑似生命オブジェクトに対するものである場合、前記コマンドに対応する信号を前記疑似生命オブジェクトに対して送信する際の制御を行う送信制御ステップとからなることを特徴とするプログラムを情報処理装置に実行させるプログラム格納媒体。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は情報処理装置および方法、並びにプログラム格納媒体に関し、特に、電子ペットとロボットに対して、同一の操作により指示が出せ、また、その指示は音声により行え、さらに、電子ペットに対しての指示か、ロボットに対しての指示かをユーザが認識できるようにする情報処理装置および方法、並びにプログラム格納媒体に関する。
【０００２】
【従来の技術】犬などを模写して作られたロボットのペットや、仮想空間内で飼育される電子ペットと称されるペットなどが普及しつつある。ロボット型のペットは、付属のリモートコントローラなどで操作されたり、音声を認識することにより動作するようにされている。また、電子ペットは、表示されたメニューの中から所望の指示が選択されることにより操作される。
【０００３】
【発明が解決しようとする課題】しかしながら、ロボット型のペットにおいて、リモートコントローラを用いて操作する場合、リモートコントローラの操作を覚えなくてはならないといった課題があり、また、音声を認識することにより動作するものの場合、遠くから呼びかけたりしても、その音声を認識しない、近くから呼びかけたとしても、認識率が悪いといった課題があった。
【０００４】電子ペットの場合、パーソナルコンピュータなどのディスプレイ上に表示され、そのディスプレイ上の同一画面上に表示されているメニューの中から、ユーザは、電子ペットに対して指示を与えるため、ペットとしての親近感がわきづらいといった課題があった。また、電子ペットとロボットに対し、同一の操作により指示を与えるといった場合、電子ペットに対して与えた指示なのに、実行したのはロボットであったり、逆に、ロボットに対して与えた指示なのに、実行したのは電子ペットであったりといった、不都合が発生するといった課題もあった。
【０００５】本発明はこのような状況に鑑みてなされたものであり、電子ペットとロボットに対して、同一の操

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作により指示が出せ、また、その指示は音声により行え、さらに、電子ペットに対しての指示か、ロボットに対しての指示かを認識できるようにすることにより、ユーザが、ロボットに対しても電子ペットに対してもペットとして親近感をもてるようにするとともに、使い勝手の良いユーザインタフェースを提供することを目的とする。

【０００６】

【課題を解決するための手段】請求項１に記載の情報処理装置は、仮想空間において飼育される仮想生命オブジェクトに対して、または、現実空間において飼育される疑似生命オブジェクトに対して、所定の動作をさせるコマンドを入力する入力手段と、入力手段により入力されるコマンドが、仮想生命オブジェクトに対するものであるか、疑似生命オブジェクトに対するものであるかを切り換える切り換え手段と、入力手段により入力されたコマンドが、仮想生命オブジェクトに対するものである場合、コマンドに対応する仮想生命オブジェクトの表示を制御する表示制御手段と、入力手段により入力されたコマンドが、疑似生命オブジェクトに対するものである場合、コマンドに対応する信号を疑似生命オブジェクトに対して送信する送信手段とを含むことを特徴とする。

【０００７】前記入力手段は、音声信号でコマンドを入力するようにすることができる。

【０００８】前記送信手段により送信される信号は、音階信号であるようにすることができる。

【０００９】前記仮想生命オブジェクトおよび前記疑似生命オブジェクトの名称は、ユーザにより付けられるようにすることができる。

【００１０】請求項５に記載の情報処理方法は、仮想空間において飼育される仮想生命オブジェクトに対して、または、現実空間において飼育される疑似生命オブジェクトに対して、所定の動作をさせるコマンドを入力する入力ステップと、入力ステップの処理で入力されるコマンドが、仮想生命オブジェクトに対するものであるか、疑似生命オブジェクトに対するものであるかを切り換える切り換えステップと、入力ステップの処理で入力されたコマンドが、仮想生命オブジェクトに対するものである場合、コマンドに対応する仮想生命オブジェクトの表示を制御する表示制御ステップと、入力ステップの処理で入力されたコマンドが、疑似生命オブジェクトに対するものである場合、コマンドに対応する信号を疑似生命オブジェクトに対して送信する送信ステップとを含むことを特徴とする。

【００１１】請求項６に記載のプログラム格納媒体のプログラムは、仮想空間において飼育される仮想生命オブジェクトに対して、または、現実空間において飼育される疑似生命オブジェクトに対して、所定の動作をさせるコマンドを入力する入力ステップと、入力ステップの処理で入力されるコマンドが、仮想生命オブジェクトに対するものであるか、疑似生命オブジェクトに対するものであるかを切り換える切り換えステップと、入力ステップの処理で入力されたコマンドが、仮想生命オブジェクトに対するものである場合、コマンドに対応する仮想生命オブジェクトの表示を制御する表示制御ステップと、入力ステップの処理で入力されたコマンドが、疑似生命オブジェクトに対するものである場合、コマンドに対応する信号を疑似生命オブジェクトに対して送信する際の制御を行う送信制御ステップとからなることを特徴とする。

【００１２】請求項１に記載の情報処理装置、請求項５に記載の情報処理方法、請求項６に記載のプログラム格納媒体においては、入力されるコマンドが、仮想生命オブジェクトに対するものであるか、疑似生命オブジェクトに対するものであるかが切り換えられ、入力されたコマンドが、仮想生命オブジェクトに対するものである場合、コマンドに対応する仮想生命オブジェクトの表示が制御され、入力されたコマンドが、疑似生命オブジェクトに対するものである場合、コマンドに対応する信号が疑似生命オブジェクトに対して送信される。

【００１３】

【発明の実施の形態】図１は、本発明を適用した情報処理システムの一実施の形態の構成を示す図である。パーソナルコンピュータ１は、後述する電子ペットやロボット３の動作を制御する。リモートコマンダ２は、ロボット３を制御する際に用いられる。

【００１４】図２は、パーソナルコンピュータ１の内部構成を示すブロック図である。パーソナルコンピュータ１のCPU（Central Processing Unit）１１は、ROM（Read Only Memory）１２に記憶されているプログラムに従って各種の処理を実行する。RAM（Random Access Memory）１３には、CPU１１が各種の処理を実行する上において必要なデータやプログラムなどが適宜記憶される。入出力インタフェース１４は、キーボード１５やマウス１６から入力された信号をCPU１１に出力する。また、入出力インタフェース１４には、ハードディスクなどから構成される記憶部１７も接続されており、そこにデータやプログラムなどが適宜記録、再生される。

【００１５】入出力インタフェース１４には、また、表示デバイスとしてのディスプレイ１８が接続されているとともに、通信部１９も接続され、他の装置と電波、光、赤外線などにより通信を行うことが可能である。さらに、入出力インタフェース１４には、音声を取り込むマイクロホン２０、画像を取り込むビデオカメラ２１、および音声を発するスピーカ２２が接続されている。ドライブ２３も、入出力インタフェース１４と接続され、フロッピー（登録商標）ディスク（不図示）などとデータの授受を行う。内部バス２４は、これらの各部を相互に接続する。

【００１６】図３は、パーソナルコンピュータ１の外観

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を表す図である。図３に示したパーソナルコンピュータ１は、俗に言われるノート型パソコンであり、そのノート型パソコンを開いた状態を表している。ディスプレイ１８の上部には、マイクロホン２０とビデオカメラ２１が設けられている。このビデオカメラ２１は、ディスプレイ１８に対して１８０度、回動可能に取り付けられている。また、キーボード１５の上部には、スピーカ２２が設けられている。

【００１７】図４は、リモートコマンダ２の内部構成を示す図である。キー４１は、主に、音階を示す複数のキーから構成されている。スピーカ４２は、キー４１により入力された音階に対応する音を発する。CPU４３は、ROM４４に記憶されているプログラム、データに基づき、例えば、操作されたキー４１を解析し、その解析された音階に基づく音を、スピーカ４２により発せさせる。RAM４５は、適宜必要なデータの書き込みや読み出しが行われる。内部バス４６は、これらの各部を相互に接続する。

【００１８】図５は、ロボット３の内部構成を示す図である。ロボット３のCPU６１は、ROM６２に記憶されているプログラムに従って各種の処理を実行する。RAM６３には、CPU６１が各種の処理を実行する上において必要なデータやプログラムなどが適宜記憶される。入出力インタフェース６４には、目などの役割を果たす複数のセンサ６５が接続されており、それらから入力された信号をCPU６１に出力する。また、入出力インタフェース６４には、ハードディスクなどから構成される記憶部６６も接続されており、そこにデータ、プログラムなどを記録、再生することができる。

【００１９】入出力インタフェース６４は、また、通信部６７とも接続され、通信部６７は、パーソナルコンピュータ１やリモートコントローラ３と電波、光、赤外線などにより通信を行う。さらに、入出力インタフェース６４には、音声を取り込むマイクロホン６８、音声を発するスピーカ６９が接続されている。モータ７０も入出力インターフェース６４に接続され、CPU６１の指示により、ロボット３の腕や足に相当する運動部７１を動作させる。内部バス７２は、これらの各部を相互に接続する。

【００２０】ここで、リモートコマンダ２によりロボット３を制御する場合を説明する。ロボット３のROM６２には、例えば、図６に示すように、ロボット３のモータ７０の動作を制御することにより、ロボット３自体を制御するロボット制御部８１と、マイクロホン６９により取り込まれた音声を解析する音階検出部８２とが記憶されている。

【００２１】図７のフローチャートを参照してロボット３の制御について説明する。ロボット３は、リモートコマンダ２により（ユーザにより）制御することも可能であると共に、その制御とは独立して、自分自身で動作を決定し、動作すること（内部イベントと称する）も可能である。そこで、ステップＳ１において、CPU６１は、内部イベントが発生したか否か、換言すれば、外部からの制御とは独立して、内部的に動作が指示されたか否かを判断する。この内部イベントの発生は、図８のフローチャートの処理に従って、発生される。

【００２２】ステップＳ１１において、所定の時間が経過したか否かが判断される。CPU６１は、外部または内部からの指示により動作をした時点から、所定の時間をカウントすることにより、所定の時間が経過したか否かを判断する。所定の時間が経過したと判断されるまで、ステップＳ１１の処理が繰り返され、所定の時間が経過したと判断されると、ステップＳ１２に進む。ステップＳ１２において、乱数が発生される。そして、ステップＳ１３において、ステップＳ１２において発生された乱数に対応するイベントがイベントリストから抽出される。

【００２３】イベントリストとは、例えば、次の表１に示すように、コマンドの内容（動作内容）、乱数、および音階がそれぞれ対応付けられたリストである。なお、音階とは、リモートコマンダ２により発せられたコマンドとしての音階を示す。また、次の表１は、一部であり、他のコマンドを追加したりすることも可能である。

【００２４】

＜表１＞

コマンドの内容	乱数	音階
前進	０１	ＣＤＦ
停止	０２	Ｄ＃ＣＦ
後退	０３	ＣＦＤ
右回転	０４	ＦＣＤ
左回転	０５	ＦＤＣ
右キック	０６	ＤＣＦ
左キック	０７	ＤＦＣ
喜ぶポーズ	０８	ＣＤ＃Ｆ
悲しむポーズ	０９	ＣＦＤ♯
くわえる	１０	ＦＣＤ＃
はなす	１１	ＦＤ♯Ｃ
立て	１２	ＣＤ♯Ｇ
座れ	１３	ＣＧＤ＃
伏せろ	１４	ＧＤ♯Ｃ
パフォーマンス１	１５	ＣＦＧ
パフォーマンス２	１６	ＣＧＦ
パフォーマンス３	１７	ＧＣＦ
パフォーマンス４	１８	ＧＦＣ
パフォーマンス５	１９	ＦＣＧ

なお、表１における音階は、アルファベットで示し、Ｃ、Ｄ、Ｅ、Ｆ、Ｇ、Ａ、Ｂは、それぞれ、ド、レ、ミ、ファ、ソ、ラ、シを表し、＃（シャープ）は半音階上げることを示している。

【００２５】ステップＳ１３において、発生された乱数

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に対応するコマンドが抽出される。このように抽出されたコマンドに対応する処理が、ステップＳ２（図７）において、ロボット制御部８１により実行される。

【００２６】一方、ステップＳ１において、内部イベントは発生していないと判断された場合、ステップＳ３に進む。ステップＳ３において、音階検出部８２は、音声信号をマイクロホン６８により受信したか否かを判断する。ステップＳ３において、音声信号を受信したと判断された場合は、ステップＳ４に進み、音声信号を受信してはいないと判断された場合は、ステップＳ１に戻り、それ以降の処理が繰り返される。

【００２７】ステップＳ４において、音階検出部８２は、受信した音声信号から音階を検出する。そして、ステップＳ５において、検出した音階は、音階コマンドであるか否かが判断される。ステップＳ３乃至Ｓ５の処理を換言すると、ロボット３のマイクロホン６８は、リモートコマンダ２から送信された音階コマンドの他にも、さまざまな音を取り込んでしまう。そこで、取り込んだ音（音声）から、音階コマンドのみを抽出する処理が必要となる。また、ユーザは、音声コマンドを構成するキー４１を操作したとは限らず、間違ったキー４１を操作した場合も考えられ、音階コマンドであるか否かを判断する処理も必要となる。

【００２８】ステップＳ５において、音階コマンドであると判断された場合は、ステップＳ６に進み、音階コマンドではないと判断された場合は、ステップＳ１に戻り、それ以降の処理が繰り返される。ステップＳ６において、検出された音階コマンドに対応するコマンドが、上記した表１から抽出され、その抽出されたコマンドに対応する処理が実行される。このように、ロボット３は、内部的に発生したイベントを実行すると共に、外部的に発生されたイベントも実行する。ユーザは、内部的に発生されたイベントに対応する処理を見て、ロボット３が、まるで生きているかのような感覚を得ることが可能であり、外部的に発生されたイベント、即ち、ユーザにより発生されたイベントに対応する処理が実行されることにより、ロボット３と一緒に遊んでいるという感覚を得ることができる。

【００２９】外部的なイベントを発生させるリモートコマンダ２の動作について、図９のフローチャートを参照して説明する。ステップＳ２１において、リモートコマンダ２のCPU４３は、キー４１からの入力が有りか否かを判断する。ステップＳ２１の処理は、キー４１からの入力があったと判断されるまで繰り返し行われる。

【００３０】ステップＳ２１において、キー４１からの入力があったと判断された場合、ステップＳ２２に進み、入力されたキー４１に対応する音階コマンドが、スピーカ４２から発せられる。このようにして発せられた音階コマンドは、ロボット３のマイクロホン６８に受信されることにより、上述したような処理が、ロボット３により実行される。

【００３１】上述したように、ロボット３は、リモートコマンダ２により制御されるとともに、パーソナルコンピュータ１により制御することも可能である。パーソナルコンピュータ１の記憶部１７には、ロボット３を制御するためのもの、音声認識するためのもの、電子ペットを制御するためのものなど、複数のアプリケーションが記憶されている。それらのアプリケーションが立ち上がった場合の機能ブロック図を図１０に示す。なお、電子ペットとは、パーソナルコンピュータ１の仮想空間で飼育されているペットのことである。

【００３２】電子ペット制御部１０１は、電子ペットの動作を制御（ディスプレイ１８上に表示されている電子ペットの表示を制御）する。音声コマンダ１０２は、音声認識エンジン１０３からの認識結果に従った処理を行う。音声認識エンジン１０３は、予め登録された認識単語や文法をエンジン用認識単語・文法１０４から読み込み、ユーザがマイクロホン２０から入力した音声を、読み込んだ単語や文法と照らし合わせて認識し、音声コマンダ１０２に認識結果を出力する。

【００３３】例えば、ユーザがマイクロホン２０から、「電子ペット制御部の立ち上げ」と入力した場合、音声認識エンジン１０３は、エンジン用認識単語・文法１０４から読み込んだ単語と文法と照らし合わし、「電子ペット制御部の立ち上げ」と入力されたと認識する。音声コマンド１０２は、その認識結果を受け取り、その受け取ったコマンドに対応する処理として、電子ペット制御部１０１を立ち上げる。このように、音声コマンダ１０２が立ち上がっている状態において、ユーザは、電子ペット制御部１０１などの所望のアプリケーションを、音声信号を入力することにより立ち上げる（起動させる）ことができる。

【００３４】ここではまず、電子ペット制御部１０１や音声コマンド１０２のアプリケーションが立ち上がる前の状態として、パーソナルコンピュータ１の電源がオンにされ、所定のオペレーションシステムが立ち上がった時からの処理を説明する。図１１は、所定のオペレーションシステムが立ち上がった状態でのディスプレイ１８上の表示例を示している。

【００３５】ディスプレイ１８上には、４個のアイコンI_1乃至I_4とカーソル１１１が表示されている。このような状態において、ユーザがマウス１６を用いてカーソル１１１を操作し、音声コマンダ１０２に対応するアイコンI_1をクリックしたとする。このような処理により、音声コマンダ１０２が立ち上がると、図１２に示したように、ディスプレイ１８上に、音声コマンダ用ＵＩ（ユーザインタフェース）１２１が表示される。

【００３６】音声コマンダ用ＵＩ１２１は、マイクロホン２０から入力された音声を認識した時の認識結果を表示する認識結果表示部１２２と、音声入力を行うことが

可能な状態であるか否かを表示する認識状態表示部１２３とから構成されている。

【００３７】図１３は、音声コマンダ１０２の動作について説明するフローチャートである。ステップＳ３１において、音声コマンダ１０２に対応するアイコン（いまの場合アイコンI_1）が操作されたか否かが判断され、操作されたと判断されると、上述したような音声コマンダ用ＵＩ１２１がディスプレイ１８上に表示されると共に、ステップＳ３２に進む。

【００３８】ステップＳ３２において、コントロール（Ctrl）キーが操作されたか否かが判断される。本実施の形態においては、キーボード１５の所定のキーとしてコントロールキーが操作されている間に、ユーザがマイクロホン２０に向かって話したことが、ユーザからの指示（コマンド）として処理される。従って、コントロールキーが操作されるまで、音声コマンダ１０２は、待機状態である。

【００３９】ステップＳ３２において、コントロールキーが操作されたと判断された場合、ステップＳ３３に進み、音声コマンダ１０２は、音声認識エンジン１０３に対して音声認識の要求を出す。ここで、音声認識エンジン１０３の動作について、図１４のフローチャートを参照して説明する。

【００４０】音声認識エンジン１０３は、ステップＳ５１において、音声コマンダ１０２から音声認識の要求が来たか否かを判断する。音声コマンダ１０２から音声認識の要求が来たと判断されるまで、ステップＳ５１の処理は繰り返され、音声認識の要求が来たと判断されると、ステップＳ５２に進む。ステップＳ５２において、マイクロホン２０より入力されたユーザの音声信号を取り込み、エンジン用認識単語・文法１０４から得られる単語と文法に当てはめて、取り込んだ音声信号を解析する。

【００４１】解析された音声認識の結果は、ステップＳ５３において、音声コマンダ１０２に対して、テキストデータとして転送される。音声コマンダ１０２は、このようにして転送された認識結果を受信したか否かを、ステップＳ３４（図１３）において判断する。ステップＳ３４において、音声認識結果を取得できなかったと判断された場合、ステップＳ３５に進み、認識不可のメッセージを音声コマンダ用ＵＩ１２１に表示させる。その表示は、例えば、音声コマンダ用ＵＩ１２１の認識結果表示部１２２に”？？？”といったものである。

【００４２】ステップＳ３５の処理が終了されると、ステップＳ３２の処理に戻り、それ以降の処理が繰り返される。一方、ステップＳ３４において、音声認識エンジン１０３から、音声認識結果としてのテキストデータを取得したと判断された場合、ステップＳ３６に進み。ステップＳ３６において、取得されたテキストデータに基づくテキストが、音声コマンダ用ＵＩ１２１の認識結果表示部１２２に表示される。

【００４３】ユーザは、認識結果表示部１２２に表示されたテキストを見て、そのテキストが、入力した音声信号と同じものである場合、コントロールキーの操作を停止する（押下していたコントロールキーから手を離す）ことにより、入力した音声信号に対応する処理を実行することを、パーソナルコンピュータ１に対して指示する。逆に、認識結果表示部１２２に表示されたテキストが、入力した音声信号と異なる場合、または、同じものであるが、指示したいこととは異なる場合、コントロールキーを操作し続けながら、シフト（Shift）キーを操作することにより、入力した音声信号に対応する処理の実行をキャンセルすることができる。

【００４４】このような処理が行われるため、音声コマンダ１０２は、ステップＳ３７において、コントロールキーへの操作が停止されたか否かを判断する。ステップＳ３７において、コントロールキーへの操作が停止されたと判断された場合、ステップＳ３８に進み、認識結果に対応するアプリケーションに転送される。例えば、認識結果が「電子ペット制御部」であった場合、電子ペット制御部１０１に認識結果が転送され、電子ペット制御部１０１は、その認識結果に対応する処理として起動する。複数のアプリケーションが起動されている場合、アクティブにされているアプリケーションに認識結果が転送される。ステップＳ３８の転送処理が終了されると、ステップＳ３２に戻り、それ以降の処理が繰り返される。

【００４５】一方、ステップＳ３７において、コントロールキーへの操作が停止されてはいないと判断された場合、ステップＳ３９に進み、コントロールキーに加えてシフトキーが操作されたか否かが判断される。ステップＳ３９において、コントロールキーに加えてシフトキーが操作されたと判断された場合は、ステップＳ４０に進み、コントロールキーに加えてシフトキーは操作されていないと判断された場合は、換言すれば、コントロールキーのみが操作され続けていると判断された場合は、ステップＳ３３に戻り、それ以降の処理が繰り返される。

【００４６】ステップＳ４０において、入力された音声信号の認識結果がキャンセルされる。即ち、認識結果表示部１２２に表示されていたテキストが消去され、新たな音声信号の入力待ちの状態となる。従って、ステップＳ３３に戻り、それ以降の処理が繰り返される。

【００４７】次に、パーソナルコンピュータ１による電子ペット及びロボット３の制御について、図１５乃至図１７のフローチャートを参照して説明する。ステップＳ６１において、電子ペット制御部１０１の起動が指示されたか否かが判断される。電子ペット制御部１０１の起動を指示する方法としては、音声コマンダ１０２が起動されている状態においては、上述したように、「電子ペット制御部」と音声認識させることにより行わせても良

いし、図１１または図１２に示した状態において、電子ペット制御部１０１に対応するアイコンをクリックすることにより行なわせても良い。なお、以下の説明において、音声コマンダ１０２は、電子ペット制御部１０１が起動される前に、起動されているとして説明する。

【００４８】電子ペット制御部１０１は、電子ペット制御部１０１の起動が指示されたと判断するまで、ステップＳ６１の処理を繰り返し、起動が指示されるとステップＳ６２に進む。ステップＳ６２において、電子ペット制御部１０１が起動されることにより、電子ペットが電子ペット表示ウィンドウに表示される。電子ペットおよび電子ペット表示ウィンドウの表示例を、図１８に示す。

【００４９】電子ペット表示ウィンドウ１３１には、円が表示されており、その円内に電子ペット１３２が表示されている。この電子ペット１３２は、ロボット３を形取ったものである。勿論、ロボット３とは全く関係ない形のペットとして表示しても良い。電子ペット表示ウィンドウ１３１内の円の上部には、この電子ペット制御部１０１の処理を終了させる際に操作される終了ボタン１３３、電子ペット１３４に対して何かしらの指示を出すときのメニューを表示させる際に操作されるメニューボタン１３４、および電子ペット１３２を見えなくしてしまうように蓋で被ってしまう際に操作される蓋ボタン１３５が設けられている。

【００５０】ステップＳ６２において、図１８に示したウィンドウがディスプレイ上に表示されると、ステップＳ６３に進む。ステップＳ６３において、内部イベントが発生したか否かが判断される。電子ペット１３２も、ロボット３と同じように、ユーザからの指示（外部的な指示）により動作するが、その動作とは別に、自分自身（内部的な指示）でも動作する。従って、ステップＳ６３における処理は、ロボット３においても行われる処理と同様であり、図８のフローチャートを参照して（図７のステップＳ１の処理として）既に説明したので、その説明は省略する。

【００５１】また、ロボット３と同様な動作を行うため、電子ペット制御部１０１は、上記した表１のリストを保持している。ステップＳ６３において、内部イベントが発生したと判断された場合、ステップＳ６４に進む。ステップＳ６４における処理は、基本的に、図７のステップＳ２の処理としてロボット３により行われる処理と同様であるが、電子ペット１３２は、ディスプレイ１８上に表示されている仮想空間内でのペットなので、その表示が制御されることにより、内部イベントに対応する動作が実行される。

【００５２】一方、ステップＳ６３において、内部イベントは発生していないと判断された場合、ステップＳ６５に進む。ステップＳ６５において、メニューボタン１３４が操作されたか否かが判断される。ステップＳ６５において、メニューボタン１３４が操作されたと判断された場合、ステップＳ７１（図１６）に進む。ステップＳ７１において、メニューがディスプレイ１８上に表示される。図１９は、メニューが表示された際の、ディスプレイ１８の表示例を示す図である。

【００５３】メニュー１４１は、電子ペット表示ウィンドウ１３１の隣、または重なる位置に表示される。メニュー１４１には、電子ペット１３２や、ロボット３に実行させたいコマンドが表示されているコマンド表示部１４３と、そのコマンド表示部１４３内のコマンドが選択され、その選択されたコマンドで決定する場合に操作される決定ボタン１４２が設けられている。また、コマンド表示部１４３の右側には、表示されきれていないコマンドを表示させる際に操作されるスクロールバーが設けられている。

【００５４】ユーザは、例えば、電子ペット１３２に実行させたい動作が、後ろに進ませたい場合、カーソル１１１を、コマンド表示部１４３内の”後退”というコマンドに合わせる。カーソル１１１が合わせられたコマンドは、文字が反転されて表示される。ユーザは、その反転表示されているコマンドで良ければ、決定ボタン１４２を操作することにより、そのコマンドを電子ペット１３２に対して指示することができる。

【００５５】ステップＳ７１において、上述したようなメニュー１４１がディスプレイ１８上に表示されたら、ステップＳ７２に進み、メニュー１４１内のコマンドが、上述したような処理により、選択されたか否かが判断される。ステップＳ７２において、コマンドが選択されたと判断された場合、ステップＳ７３に進み、その選択されたコマンドに対応する動作が、電子ペット１３２により行われる。上述したように、電子ペット１３２は、仮想区間内で飼育されている、ディスプレイ１８上に表示されているペットなので、電子ペット制御部１０１は、選択されたコマンドに対応する動作を、電子ペット１３２がしているような表示がされるように、その表示を制御する。

【００５６】一方、ステップＳ７２において、メニュー内のコマンドが選択されてはいないと判断された場合、ステップＳ７４に進み、電子ペット制御部１０１は、音声コマンダ１０２よりテキストデータの転送を受けたか否かを判断する。音声コマンダ１０２が起動されている状態においては、メニュー１４１から所望のコマンドを選択しても良いが、音声コマンダ１０２によりコマンドを入力しても良い。音声コマンダ１０２による指示の仕方（音声コマンダ１２の動作）は、既に説明したので、その説明は省略する。

【００５７】ステップＳ７４において、電子ペット制御部１０１が、音声コマンダ１０２からテキストデータの転送を受けたと判断した場合、ステップＳ７５に進み、その転送されてきたテキストデータは、コマンドを構成

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するか否かを判断する。コマンドは、一部を上記した表１に示したリスト内にあるものであり、例えば、”後退”という意味を示すテキストデータである場合は、コマンドを構成すると判断されるが、”バック”という意味を示すテキストデータである場合は、コマンドを構成しないと判断される。勿論、リストに無いテキストデータは、コマンドを構成しないと判断される。

【００５８】ステップＳ７５において、転送されたテキストデータがコマンドを構成すると判断された場合、ステップＳ７３に進み、既に上述したように、そのコマンドに対応する表示処理が行われ、ステップＳ７２に戻り、それ以降の処理が繰り返される。一方、ステップＳ７５において、テキストデータは、コマンドを構成しないと判断された場合、ステップＳ７３の処理を省略して、ステップＳ７２に戻り、それ以降の処理が繰り返される。

【００５９】一方、ステップＳ７４において、電子ペット制御部１０１が、音声コマンド１０２からテキストデータの転送を受けていないと判断した場合、ステップＳ７６に進み、蓋ボタン１３５が操作されたか否かを判断する。蓋ボタン１３５が操作されたと判断された場合、ステップＳ７７に進み、電子ペット表示ウィンドウ１３１に、蓋を被せた表示を行う。蓋が被せられた電子ペット表示ウィンドウ１３１の表示例を、図２０に示す。図２０に示した表示例においては、電子ペット表示ウィンドウ１３１に蓋１５１が被された為に、電子ペット１３２が見えなくなっている。

【００６０】このように、電子ペット１３２が見えなくなるように蓋１５１が被された場合、メニュー１４１から選択されるコマンドや、音声コマンダ１０２を用いて入力されるコマンドは、電子ペット１３２に対してではなく、ロボット３に対して出されるコマンドになる。このような表示が行われることにより、ユーザは、視覚的に、いま、コマンドを出したら、電子ペット１３２に対してか、ロボット３に対してかを認識することができる。

【００６１】ステップＳ７７において、電子ペット表示ウィンドウ１３１に蓋１５１が被された状態になったら、ステップＳ８１（図１７）に進み、それ以降の処理が行われる。上述したように、蓋１５１が被された状態のときに出されるコマンドは、ロボット３に対してであり、蓋１５１が被されていない状態のときに出されるコマンドは、電子ペット１３２に対してであるということ以外は、基本的に同じであるので、ステップＳ８１乃至Ｓ８７（図１７）の処理は、ステップＳ７２乃至Ｓ７８（図１６）の処理と同様であるので、その説明は省略する。

【００６２】ただし、ステップＳ８２において行われる処理は、ロボット３に対して行われる処理であるので、コマンドに対応する音階コマンドが出力される。即ち、電子ペット制御部１０１は、蓋１５１が被されてる状態では、ロボット３の制御部として働き、ステップＳ８１において選択されたコマンド、又は、ステップＳ８３，Ｓ８４の処理において出されたコマンドは、音階コマンドに変換されて、スピーカ２２からロボット３に対して発せされる。コマンドを音階コマンドに変換する処理は、表１のリストに従って行われる。

【００６３】このように、ユーザが、コマンドを出すという動作をした場合、蓋１５１が被さっているか、いないかにより、そのコマンドが出された（指示対象）が異なる。このようにすることにより、ユーザは、蓋１５１が被さっているか否かを見ることにより、指示対象を認識できるばかりでなく、電子ペット１３２とロボット３に対して、同時にコマンドが出されるといった不都合を解消することができる。

【００６４】図１７のフローチャートの説明に戻り、ステップＳ８５において、蓋ボタン１３５が操作されてはいないと判断された場合、ステップＳ８７に進み、終了ボタン１３３が操作されたか否かが判断される。ステップＳ８７において、終了ボタン１３３は操作されていないと判断された場合は、ステップＳ８１に戻り、それ以降の処理が繰り返され、終了ボタン１３３が操作されたと判断された場合は、ステップＳ６９（図１５）に進む。

【００６５】また、ステップＳ６５において、メニューボタン１３４が操作されてはいないと判断され、ステップＳ６６において、蓋ボタン１３５が操作されてはいないと判断され、さらに、ステップＳ６８において、終了ボタン１３３が操作されたと判断された場合と、ステップＳ７６（図１６）において、蓋ボタン１３５は操作されていないと判断され、ステップＳ７８において、終了ボタン１３３が操作されたと判断された場合においても、ステップＳ６９の処理に来る。

【００６６】ステップＳ６９において、終了処理が実行される。終了処理としては、電子ペット表示ウィンドウ１３１と、メニュー１４１が閉じられる。

【００６７】図１５のステップＳ６６において、電子ペット表示ウィンドウ１３１が表示された状態で、蓋ボタン１３５が操作されたと判断された場合、ステップＳ６７に進み、電子ペット表示ウィンドウ１３１に蓋１５１が被された表示とされ、さらに、メニュー１４１が表示される。メニュー１４１が表示されると、ステップＳ８１に進み、それ以降の処理が実行される。

【００６８】このように、メニュー１４１が表示されていない状態で、蓋ボタン１３５が操作された場合、蓋１５１を被らせると共に、メニュー１４１を表示させるようにしても良いし、表示させなくても良い。表示させない場合は、蓋ボタン１３５が操作されるとは別に、ユーザによりメニューボタン１３４の操作が必要となる。また、メニュー１４１が表示されなくても、音声コマンダ

１０２により指示を出すことは可能なので、メニュー１４１を常に表示させる必要もない。

【００６９】上述した実施の形態においては、音声コマンダ１０２は、ユーザの指示により起動されるようにしたが、パーソナルコンピュータ１の電源がオンにされ、所定のオペレーションシステムが起動される時に、音声コマンダ１０２も起動されるようにしても良い。

【００７０】メニュー１４１に、電子ペット１３２およびロボット３の名前を設定するためのウィンドウを開く為のボタンを設けるようにしても良い。そのようなボタンが設けられ、操作された場合、名前を設定する為のウィンドウが開かれ、ユーザは、電子ペット１３２とロボット３に対して、好きな名前を付けることができる。この際、電子ペット１３２とロボット３に、同じ名前を付けられるようにしても良いし、異なる名前が付けられるようにしても良い。さらに、パーソナルコンピュータ１を複数のユーザが共有して使う場合、ユーザ毎に異なる名前を付けることも可能である。

【００７１】上述した一連の処理は、ハードウェアにより実行させることもできるが、ソフトウェアにより実行させることもできる。一連の処理をソフトウェアにより実行させる場合には、そのソフトウェアを構成するプログラムが、専用のハードウエアに組み込まれているコンピュータ、または、各種のプログラムをインストールすることで、各種の機能を実行することが可能な、例えば、汎用のパーソナルコンピュータなどに、プログラム格納媒体からインストールされる。

【００７２】コンピュータにインストールされ、コンピュータによって実行可能な状態とされるプログラムを格納するプログラム格納媒体は、図２１に示すように磁気ディスク２０１（フロッピディスクを含む）、光磁気ディスク２０２（CD-ROM（Compact Disk-Read Only Memory），DVD（Digital Versatile Disk）を含む）、光磁気ディスク２０３（MD （Mini-Disk）を含む）、もしくは半導体メモリ２０４などよりなるパッケージメディア、または、プログラムが一時的若しくは永続的に格納されるROM１２や記憶部１７を構成するハードディスクなどにより構成される。プログラム格納媒体へのプログラム格納媒体へのプログラムの格納は、必要に応じてルータ、モデムなどのインタフェースを介して、ローカルエリアネットワーク、インターネット、デジタル衛星放送といった有線または無線の通信媒体を利用して行われる。

【００７３】なお、本明細書において、媒体により提供されるプログラムを記述するステップは、記載された順序に従って、時系列的に行われる処理は勿論、必ずしも時系列的に処理されなくとも、並列的あるいは個別に実行される処理をも含むものである。

【００７４】また、本明細書において、システムとは、複数の装置により構成される装置全体を表すものである。

【００７５】

【発明の効果】以上の如く、請求項１に記載の情報処理装置、請求項５に記載の情報処理方法、請求項６に記載のプログラム格納媒体によれば、入力されるコマンドが、仮想生命オブジェクトに対するものであるか、疑似生命オブジェクトに対するものであるかを切り換え、入力されたコマンドが、仮想生命オブジェクトに対するものである場合、コマンドに対応する仮想生命オブジェクトの表示を制御し、入力されたコマンドが、疑似生命オブジェクトに対するものである場合、コマンドに対応する信号を疑似生命オブジェクトに対して送信するようにしたので、仮想生命オブジェクトと疑似生命オブジェクトに、同一の操作で指示が出せ、もって使い勝手の良いユーザインタフェースが提供されることが可能となる。

【図面の簡単な説明】

【図１】本発明を適用した情報処理システムの一実施の形態の構成を示す図である。

【図２】パーソナルコンピュータ１の内部構成を示す図である。

【図３】パーソナルコンピュータ１の外観を示す図である。

【図４】リモートコマンダ２の内部構成を示す図である。

【図５】ロボット３の内部構成を示す図である。

【図６】ROM６２に記憶されているアプリケーションを説明する図である。

【図７】ロボット３の制御動作を説明するフローチャートである。

【図８】内部イベント発生処理を説明するフローチャートである。

【図９】リモートコマンダ２の動作を説明するフローチャートである。

【図１０】パーソナルコンピュータ１の機能を示すブロック図である。

【図１１】ディスプレイ１８上の表示例を示す図である。

【図１２】音声コマンダ用ＵＩが表示された状態を説明する図である。

【図１３】音声コマンダの処理を説明するフローチャートである。

【図１４】音声認識エンジンの処理を説明するフローチャートである。

【図１５】電子ペット及びロボットの制御処理を説明するフローチャートである。

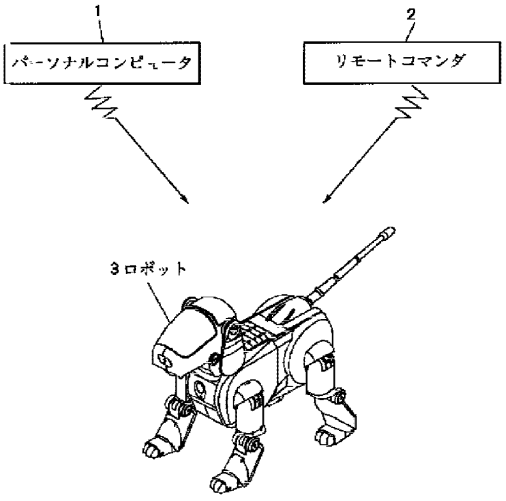
【図１６】図１５のフローチャートの続きを示すフローチャートである。

【図１７】図１６のフローチャートの続きを示すフローチャートである。

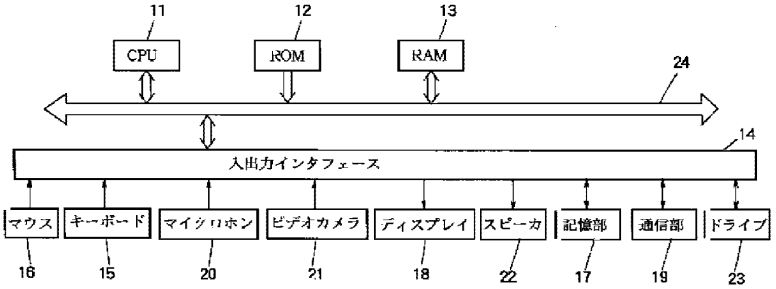
【図１８】ディスプレイ１８上の表示例を示す図であ

る。
【図１９】ディスプレイ１８上の表示例を示す図である。
【図２０】ディスプレイ１８上の表示例を示す図である。
【図２１】媒体について説明する図である。
【符号の説明】
１　パーソナルコンピュータ，　２　リモートコマンダ，　３　ロボット，１１　CPU，　１２　ROM，　１３　RAM，　１４　入出力インタフェース，　１５　キーボード，　１６　マウス，　１７　記憶部，　１８　ディスプレイ，１９　通信部，　２０　マイクロホン，　２１　ビデオカメラ，　２２　スピーカ，　２３　ドライブ，　４１　キー，　４２　スピーカ，　６８　マイクロホン，　６９　スピーカ，　７０　モータ，　７１　運動部，　８１　ロボット制御部，　８２　音階検出部，　１０１　電子ペット制御部，　１０２　音声コマンダ，　１０３　音声認識エンジン，　１０４　エンジン用認識単語・文法，１１１　カーソル，　１２１　音声コマンダ用ＵＩ，　１３１　電子ペット表示ウィンドウ，　１３２　電子ペット，　１３３　終了ボタン，　１３４　メニューボタン，　１３５　蓋ボタン，　１４１　メニュー，　１５１　蓋

【図１】

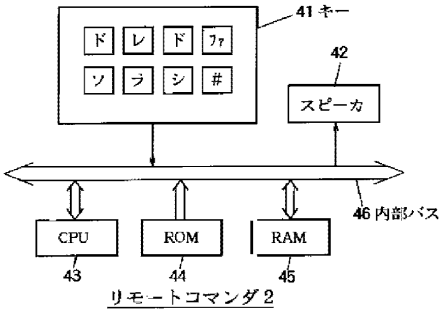


【図２】



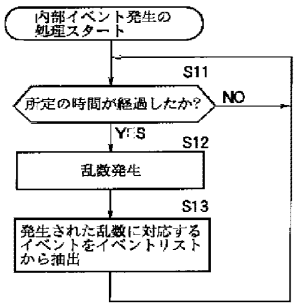
パーソナルコンピュータ１

【図４】

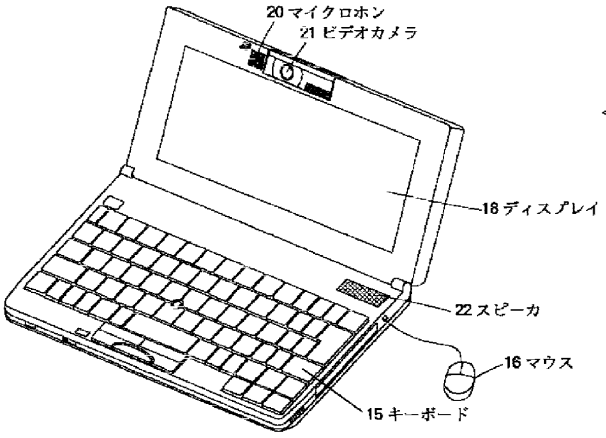


リモートコマンダ２

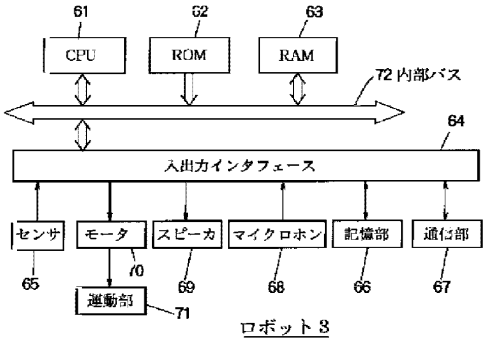
【図８】



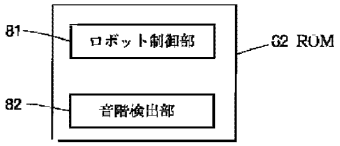
【図３】



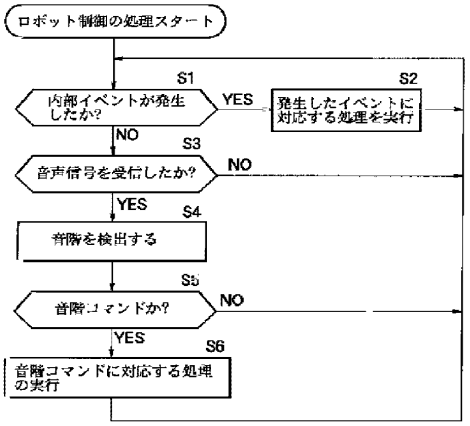
【図５】



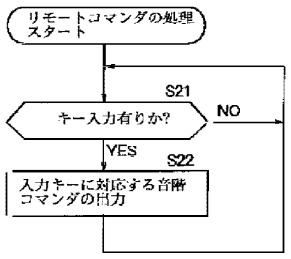
【図６】



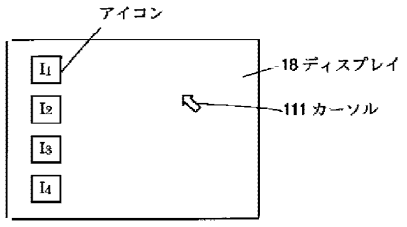
【図７】



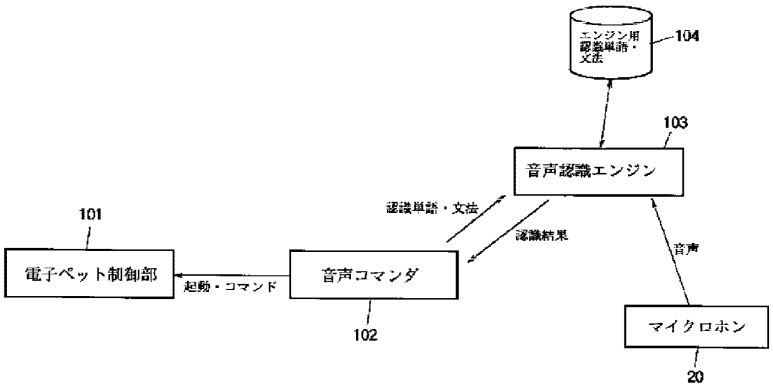
【図９】



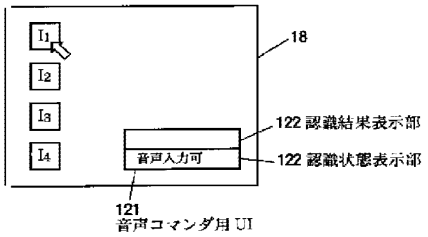
【図１１】



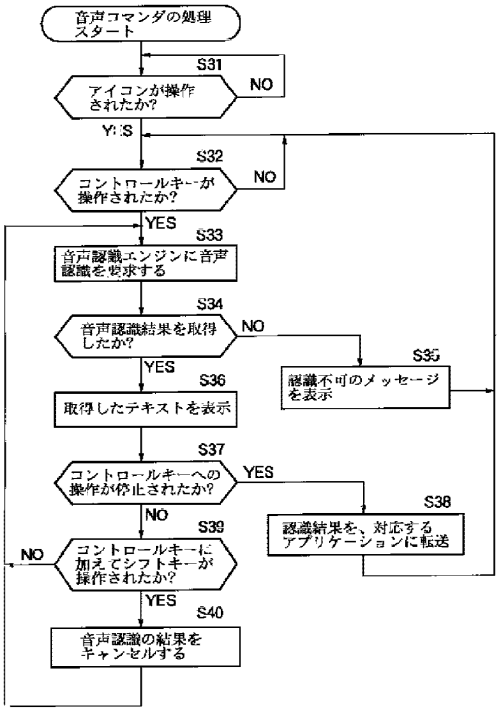
【図１０】



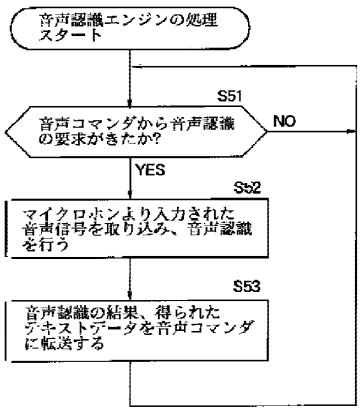
【図１２】



【図１３】

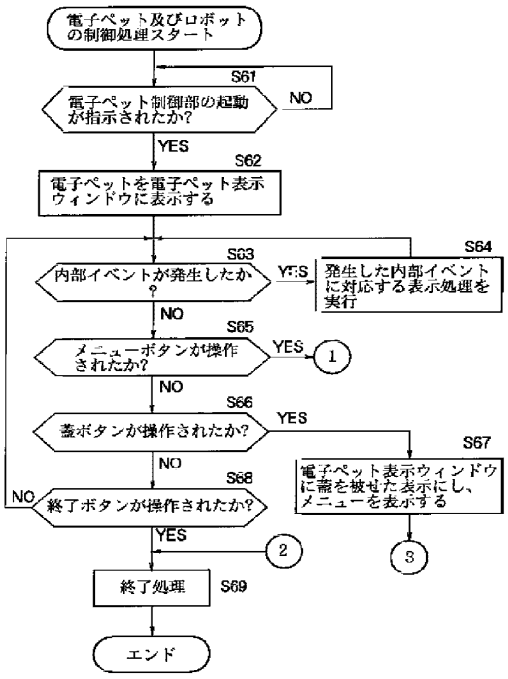


【図１４】



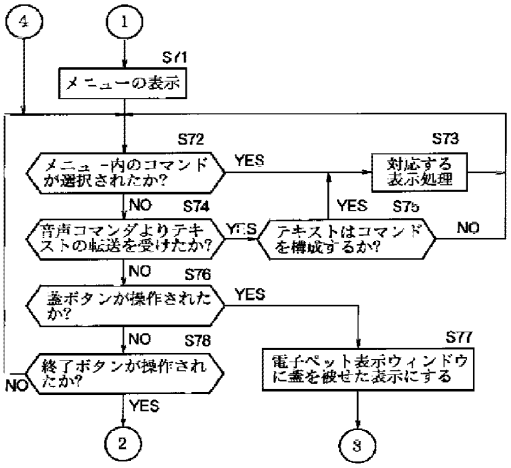
【図１５】

15-1



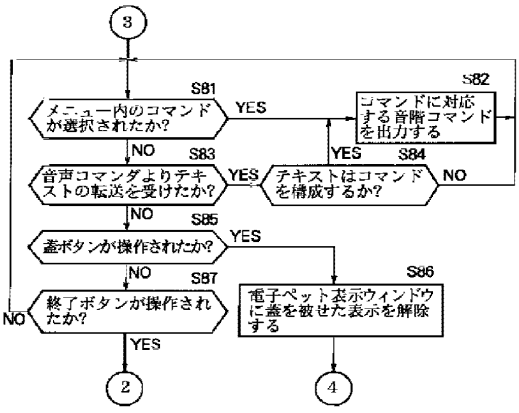
【図１６】

15-2



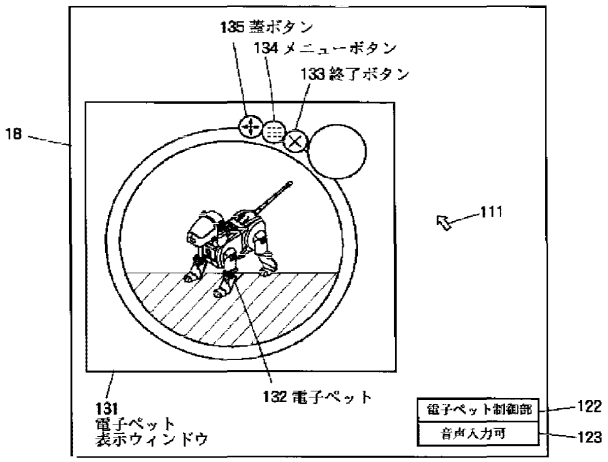
【図１７】

15-3

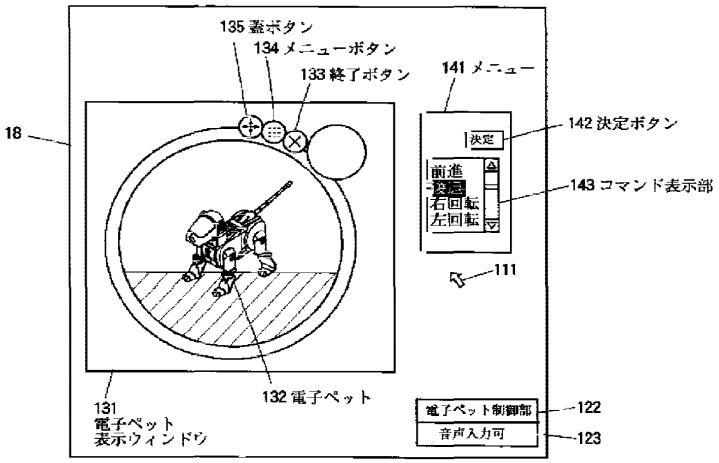


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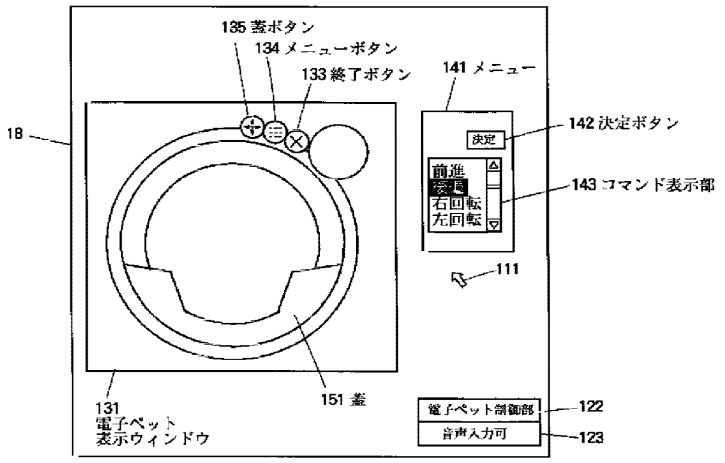
【図18】


135 蓋ボタン
134 メニューボタン
133 終了ボタン
18
111
132 電子ペット
131
電子ペット
表示ウィンドウ
電子ペット制御部
122
音声入力可
123

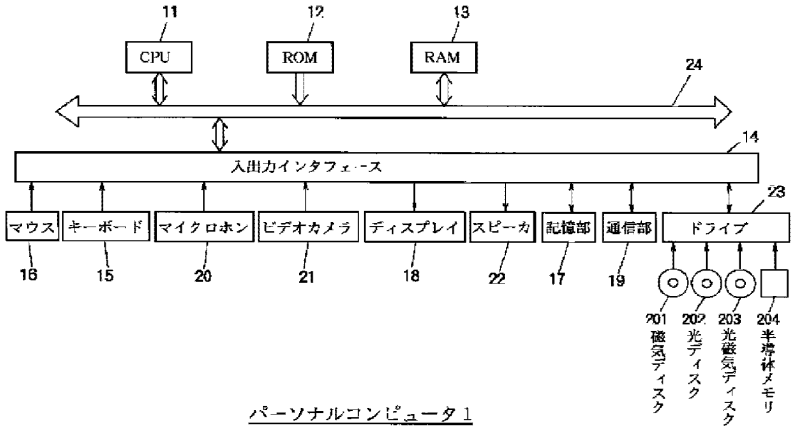
【図19】


135 蓋ボタン
134 メニューボタン
133 終了ボタン
141 メニュー
142 決定ボタン
決定
前進
後退
右回転
左回転
143 コマンド表示部
18
111
132 電子ペット
131
電子ペット
表示ウィンドウ
電子ペット制御部
122
音声入力可
123

【図２０】



【図２１】



パーソナルコンピュータ１

フロントページの続き

(51)Int.Cl.[7]	識別記号	ＦＩ		(参考)
Ｇ０６Ｆ 3/16	３４０	Ｇ０６Ｆ 3/16	３４０Ｚ	
Ｇ１０Ｌ 15/00		Ｇ１０Ｌ 3/00	５５１Ｈ	

(72)発明者 米倉 修二
東京都品川区北品川６丁目７番35号 ソニー株式会社内

(72)発明者 藤村 聡
東京都品川区北品川６丁目７番35号 ソニー株式会社内

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Page 1370

(72)発明者　笹井　崇司
東京都品川区北品川６丁目７番35号　ソニー株式会社内
(72)発明者　藤澤　直樹
東京都品川区北品川６丁目７番35号　ソニー株式会社内
(72)発明者　大井　純司
東京都品川区北品川６丁目７番35号　ソニー株式会社内
(72)発明者　野間　恒毅
東京都品川区北品川６丁目７番35号　ソニー株式会社内
(72)発明者　横尾　直弘
東京都品川区北品川６丁目７番35号　ソニー株式会社内
(72)発明者　後藤　太
東京都品川区北品川６丁目７番35号　ソニー株式会社内

Ｆターム(参考)　2C150 AA14 BA06 CA02 DA05 DA23
DK02 EF29
3F059 AA00 BB06 BC06 DA08 DB02
DD08 DD11 DD18 FA03 FC14
5D015 AA06 KK01 LL05
5E501 AA02 AA17 AC15 AC16 BA02
BA05 CA02 CA08 CB02 CB09
CB15 CC02 EA05 EA11 EA21
EB01 FA04 FA05 FA13 FA14
FA32 FB28

Electronic Acknowledgement Receipt

EFS ID:	25046048
Application Number:	14691445
International Application Number:	
Confirmation Number:	8351
Title of Invention:	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE
First Named Inventor/Applicant Name:	Larry BALDWIN
Customer Number:	133759
Filer:	Hean Lee Koo/Susan Trader
Filer Authorized By:	Hean Lee Koo
Attorney Docket Number:	45HV-218492
Receipt Date:	29-FEB-2016
Filing Date:	20-APR-2015
Time Stamp:	13:37:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	45HV-218492_IDS_1449.pdf	45438 0445bd8c455b9a9359148b6a068832f1b274d36f	no	3

Warnings:	
Information:	

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2	Foreign Reference	45HV-218492-CITE-47.pdf	807379 07e2364d8c5c6ac26fe8edc02cc355e00b52d534	no	18
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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	14/691,445
	Filing Date	4/20/2015
	First Named Inventor	Larry BALDWIN
	Art Unit	2658
	Client Number	45HV
Page 1 of 3	**Matter Number**	218492

U.S. PATENT DOCUMENTS					
Initials	**Cite No.**	**Document Number**	**Issue/Publication Date**	**First Named Inventor**	**T**
	1	20020010584	01/24/2002	Schultz	
	2	20020073176	06/13/2002	Ikeda	
	3	20020152260	10/17/2002	Chen	
	4	20040030741	02/12/2004	Wolton	
	5	20040036601	02/26/2004	Obradovich	
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	28	6119101	09/12/2000	Peckover	
	29	6286002	09/04/2001	Axaopoulos	
	30	6810375	10/26/2004	Ejerhed	

Examiner Signature		**Date Considered**	
Examiner: Please initial if citation considered, whether or not citation is in conformance with MPEP Section 609. Please draw a line through the citation if it is not in conformance and it is not considered. Please include a copy of this form with the next communication to the applicant.			

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	14/691,445
	Filing Date	4/20/2015
	First Named Inventor	Larry BALDWIN
	Art Unit	2658
	Client Number	45HV
Page 2 of 3	**Matter Number**	218492

U.S. PATENT DOCUMENTS					
Initials	**Cite No.**	**Document Number**	**Issue/Publication Date**	**First Named Inventor**	**T**
	31	7706616	04/27/2010	Kristensson	
	32	7792257	09/07/2010	Vanier	
	33	8719005	05/06/2014	Lee	
	34	8849696	09/30/2014	Pansari	
	35	9015049	04/21/2015	Baldwin	
	36	9105266	08/11/2015	Baldwin	
	37	9171541	10/27/2015	Kennewick	

FOREIGN PATENT DOCUMENTS					
Initials	**Cite No.**	**Document Number**	**Publication Date**	**Country**	**T**
	38	2011504304	02/03/2011	JP	T3

OTHER DOCUMENTS			
Initials	**Cite No.**	**Author, Title, Date, Pages, etc.**	**T**
	39	KIRCHHOFF, Katrin, "Syllable-Level Desynchronisation of Phonetic Features for Speech Recognition", Proceedings of the Fourth International Conference on Spoken Language, 1996, ICSLP 96, Volume 4, IEEE, 1996, 3 pages.	
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	41	WU, Su-Lin, et al., "Integrating Syllable Boundary Information into Speech Recognition", IEEE International Conference on Acoustics, Speech, and Signal Processing, ICASSP-97, 1997, Volume 2, IEEE, 1997, 4 pages.	

Examiner Signature		**Date Considered**	
Examiner: Please initial if citation considered, whether or not citation is in conformance with MPEP Section 609. Please draw a line through the citation if it is not in conformance and it is not considered. Please include a copy of this form with the next communication to the applicant.			

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	Application Number	14/691,445
	Filing Date	4/20/2015
	First Named Inventor	Larry BALDWIN
	Art Unit	2658
	Client Number	45HV
Page 3 of 3	**Matter Number**	218492

GENERAL

Pursuant to 37 C.F.R. 1.97 and 1.98 and to the duty of disclosure set forth in 37 C.F.R. 1.56, the Examiner in charge of the above-identified application is requested to consider and make of record the references listed herewith. A copy of each listed reference, other than U.S. patents/applications and references cited in a parent application, is enclosed.

Although the information submitted herewith may be "material" to the Examiner's consideration of the subject application, this submission is not intended to constitute an admission that such information is "prior art" as to the claimed invention.

In accordance with 37 C.F.R. 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made.

TIMING

In accordance with 37 CFR 1.97(b), this Information Disclosure Statement is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53(d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits; or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

CERTIFICATION STATEMENT

No certification statement is required. This Information Disclosure Statement is being filed in accordance with 37 CFR 1.97(b).

FEE

No fee is required. This Information Disclosure Statement is being filed in accordance with 37 CFR 1.97(b).

If necessary, the Director is hereby authorized to charge or credit Deposit Account No. 501067 for any additional fees, or any underpayment or credit for overpayment in connection herewith. Please reference attorney docket number 45HV-218492 for any such charge or credit.

NON-ENGLISH LANGUAGE DOCUMENTS

T1: Non-English language document and/or corresponding English language equivalent document.

T2: This reference is not in English, but an English translation is attached to the reference submitted herewith.

T3: This reference is not in English, but an English abstract is attached to the reference submitted herewith.

For each reference not in the English language which was cited by a foreign patent office in a counterpart foreign application, a copy of the English language search report or Office action, indicating the degree of relevance determined by the foreign patent office is submitted herewith. MPEP Section 609.04(a)III, second paragraph.

SIGNATURE

Signature	/ Hean L. Koo /	Date	2015-10-28
Name	Hean L. Koo	Registration Number	61214

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(19)日本国特許庁(JP)　(12)公表特許公報(A)　(11)特許出願公表番号
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G06F 3/16	(2006.01)	G06F	3/16	320H	5K127
H04M 3/493	(2006.01)	H04M	3/493		5K201
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G10L 15/00	(2006.01)	G10L	15/00	200A	

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(87)国際公開番号　WO2009/035842
(87)国際公開日　平成21年3月19日 (2009.3.19)
(31)優先権主張番号　11/854,523
(32)優先日　平成19年9月12日 (2007.9.12)
(33)優先権主張国　米国(US)

(71)出願人　500046438
マイクロソフト　コーポレーション
アメリカ合衆国　ワシントン州　９８０５２－６３９９　レッドモンド　ワン　マイクロソフト　ウェイ
(74)代理人　100077481
弁理士　谷　義一
(74)代理人　100088915
弁理士　阿部　和夫
(72)発明者　クリフォード　ニール　ディドコック
アメリカ合衆国　９８０５２　ワシントン州　レッドモンド　ワン　マイクロソフト　ウェイ　マイクロソフト　コーポレーション　インターナショナル　パテンツ内

最終頁に続く

(54)【発明の名称】パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプション

(57)【要約】
ＰＣＤ(personal communication device)用のスピーチ・トゥ・テキスト・トランスクリプション・システムを、１つまたは複数のＰＣＤに通信連結される通信サーバーに格納する。例えば、ＰＣＤのユーザーは、電子メールをＰＣＤの中へディクテートする。ＰＣＤは、ユーザーの音声をスピーチ信号にコンバートして、コンバートされたスピーチ信号をサーバーに置かれたスピーチ・トゥ・テキスト・トランスクリプション・システムに送信する。スピーチ・トゥ・テキスト・トランスクリプション・システムは、スピーチ信号をテキストメッセージにトランスクライブする。次に、テキストメッセージを、サーバーがＰＣＤに送信する。テキストメッセージの受信によって、ユーザーは、テキストメッセージを種々のアプリケーションにおいて使用する前に、間違ってトランスクライブされた単語の訂正を実行する。

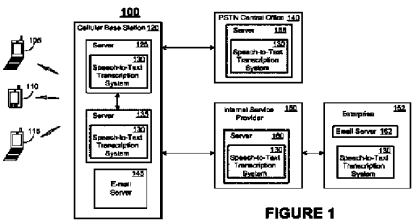


FIGURE 1

【特許請求の範囲】
【請求項１】
テキストを生成する方法であって、
パーソナル通信デバイス（１０５）へ話すことによりスピーチ信号を生成すること、
前記生成されたスピーチ信号を送信すること、
前記送信に応答して、前記パーソナル通信デバイス（１０５）の外部に置かれたスピーチ・トゥ・テキスト・トランスクリプション・システム（１３０）を使用して、前記スピーチ信号をトランスクライブすることによって生成された、前記パーソナル通信デバイス（１０５）のテキストメッセージを受信すること
を備えたことを特徴とする方法。
【請求項２】
前記スピーチ信号は、電子メールアドレス、件名テキスト、または電子メールメッセージの本文の少なくとも一部のうちの少なくとも１つを話す結果として生成されることを特徴とする請求項１に記載の方法。
【請求項３】
前記スピーチ信号を生成することは、
前記パーソナル通信デバイスの前記スピーチ信号の少なくとも一部を格納することを含み、前記生成されたスピーチ信号を送信することは、
遅延送信モードにより前記格納されたスピーチ信号を送信するために、前記パーソナル通信デバイスのボタンを押下させることを含むことを特徴とする請求項１に記載の方法。
【請求項４】
前記スピーチ信号を生成することは、
トランスクリプションを要求するために、前記パーソナル通信デバイスのボタンを押下させることを含み、前記生成されたスピーチ信号を送信することは、
前記パーソナル通信デバイスがＡＣＫを受信すること、
ライブ送信モードにより前記スピーチ信号を送信すること
を含むことを特徴とする請求項１に記載の方法。
【請求項５】
前記生成されたスピーチ信号を送信することは、漸次送信モードにより前記スピーチ信号を送信することを含むことを特徴とする請求項１に記載の方法。
【請求項６】
前記生成されたスピーチ信号を送信することは、
デジタルフォーマットにより前記スピーチ信号を送信すること、
通信呼として前記スピーチ信号を送信すること
のうちの少なくとも１つを含むことを特徴とする請求項１に記載の方法。
【請求項７】
前記デジタルフォーマットは、ＩＰのデジタルフォーマットを含むことを特徴とする請求項６に記載の方法。
【請求項８】
前記テキストメッセージを編集すること、
前記テキストメッセージを電子メールの形より送信すること
をさらに備えたことを特徴とする請求項１に記載の方法。
【請求項９】
前記テキストメッセージを編集することは、
前記代替の単語を手動によりタイプして入力すること、または前記スピーチ・トゥ・テキスト・トランスクリプション・システムによって提供された代替の単語のメニューから前記代替の単語を選択することの１つによって実行され、前記テキストメッセージの少なくとも１つの単語を取替えること
を含むことを特徴とする請求項８に記載の方法。
【請求項１０】

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テキストを生成する方法であって、
第１のサーバー（２１０）が、パーソナル通信デバイス（１０５）によって生成されたスピーチ信号を受信すること、
第２のサーバー（１２５）に置かれたスピーチ・トゥ・テキスト・トランスクリプション・システム（１３０）を使用することによって前記受信されたスピーチ信号をテキストメッセージにトランスクライブすること、
前記生成されたテキストメッセージを前記パーソナル通信デバイス（１０５）に送信すること
を備えたことを特徴とする方法。
【請求項１１】
前記第１のサーバーは、前記第２サーバーと同一であることを特徴とする請求項１０に記載の方法。
【請求項１２】
前記第１サーバーが、前記パーソナル通信デバイスからのトランスクリプション要求を受信すること、
前記受信に応答して、前記パーソナル通信デバイスからのスピーチ信号を、デジタルデータのパケットの形により前記第１サーバーに転送するために、前記第１のサーバーと前記パーソナル通信デバイスとの間にデータのパケット伝送リンクを設定すること
をさらに備えたことを特徴とする請求項１０に記載の方法。
【請求項１３】
前記スピーチ・トゥ・テキスト・トランスクリプション・システムを使用することは、
話された単語のスピーチ認識のために代替の候補のリストを生成すること
を含み、前記代替の候補の各々は、認識の正確さに結びつけられた信頼要因を有することを特徴とする請求項１０に記載の方法。
【請求項１４】
前記第１のサーバーから前記パーソナル通信デバイスに、トランスクライブされた単語にリンクされるドロップダウンメニューの形により代替の候補のリストを送信することをさらに備えたことを特徴とする請求項１３に記載の方法。
【請求項１５】
サーバー（２１０、１２５）をパーソナル通信デバイス（１０５）に通信連結する手順、
前記サーバー（２１０、１２５）によって、前記パーソナル通信デバイス（１０５）により生成されたスピーチ信号を受信する手順、
前記サーバー（２１０、１２５）に置かれたスピーチ・トゥ・テキスト・トランスクリプション・システム（１３０）を使用することによって、前記受信されたスピーチ信号をテキストメッセージにトランスクライブする手順、
前記生成されたテキストメッセージを前記パーソナル通信デバイス（１０５）に送信する手順
を実行させるコンピューター読取り可能な命令を格納するコンピューター読取り可能な記憶媒体。
【請求項１６】
前記スピーチ・トゥ・テキスト・トランスクリプション・システムを使用する手順は、
話された単語のスピーチ認識のために代替の候補のリストを生成する手順、
最も高い信頼要因を有する前記代替の候補の１つを使用することによって前記話された単語からトランスクライブされた単語を生成する手順、
前記代替の候補のリストを前記トランスクライブされた単語に追加する手順
を含み、前記代替の候補の各々は、認識の正確さに結びつけられた信頼要因を有することを特徴とする請求項１５に記載のコンピューター読取り可能な記憶媒体。
【請求項１７】
前記生成されたテキストメッセージを前記パーソナル通信デバイスに送信する手順は、

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前記代替の候補に追加されたリストと一緒に前記トランスクライブされた単語を、前記パーソナル通信デバイスに送信する手順を含むことを特徴とする請求項１６に記載のコンピューター読取り可能な記憶媒体。

【請求項１８】

前記代替の候補のリストは、ドロップダウンメニューの形により前記トランスクライブされた単語に追加されることを特徴とする請求項１７に記載のコンピューター読取り可能な記憶媒体。

【請求項１９】

少なくとも１つの望まれる専門用語の単語またはスピーチ認識のトレーニングの単語を含むデータベースを生成する手順を実行させるコンピューター読取り可能な命令をさらに格納することを特徴とする請求項１５に記載のコンピューター読取り可能な記憶媒体。

【請求項２０】

前記パーソナル通信デバイスの生成されたテキストメッセージを編集する手順、

前記パーソナル通信デバイスから、電子メールの形により前記テキストメッセージを送信する手順

を実行させるコンピューター読取り可能な命令をさらに格納することを特徴とする請求項１９に記載のコンピューター読取り可能な記憶媒体。

【発明の詳細な説明】

【技術分野】

【０００１】

本発明は、パーソナル通信デバイスに関し、より詳細には、パーソナル通信デバイスに利するサーバーリソースによるスピーチ・トゥ・テキスト・トランスクリプション（speech-to-text transcription）に関する。

【背景技術】

【０００２】

例えば、携帯電話またはＰＤＡ（personal digital assistant）などのパーソナル通信デバイスのユーザーは、キーパッドを使用して、およびサイズにおいて、同様にして機能においても制限される他のテキストの情報入力装置を使用して、テキストの入力を強いられ、それによって程度の大きい不便な状態に、同様にして非能率な状態にも至る。例えば、通常、携帯電話のキーパッドは、多機能のキーであるいくつかのキーを含む。特に、単一のキーを使用して、例えば、Ａ、Ｂ、またはＣなど、３つのアルファベットのうちの１つを入力する。ＰＤＡのキーパッドによって、個々のキーを個々のアルファベットに対して使用するクワーティ配列のキーボードを組み入れることによりいくらかの改善を与える。それにもかかわらず、キーの小型のサイズは、あるユーザーに不便となり、および他のユーザーに過酷なハンディとなる。

【０００３】

上記のハンディの結果として、情報をパーソナル通信デバイスに入力するための種々のいく通りかのソリューションが導入された。例えば、スピーチ認識システムは、声によって入力できるようにするために、携帯電話に埋め込まれた。このアプローチによって、例えば話されるコマンドを使用して電話番号をダイヤルするためになどの、ある利点を与えた。しかしながら、上記のアプローチによって、例えば費用およびモバイルデバイスにおけるコストおよびハードウェア／ソフトウェアの制限に関する種々の要因のために電子メールのテキストの情報入力などの、より複雑なタスクに対して要求を満たすことができなかった。

【発明の概要】

【０００４】

本発明の概要を与えて、発明の詳細な説明にて以下にさらに説明する簡略化された形において概念の１つの選択を導入する。本発明の概要によって、主張される主題の重要な特徴または基本的な特徴を識別することを意図せず、主張される主題の範囲を制限するのに用いられることもまた意図しない。

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【０００５】
テキストを生成する一つの例示的な方法において、スピーチ信号を、例えば、電子メールの一部をＰＣＤ（personal communications device）の中へ話すことによって作成する。生成されたスピーチ信号を、サーバーに送信する。サーバーは、スピーチ・トゥ・テキスト・トランスクリプション・システムを収容する。収容されたスピーチ・トゥ・テキスト・トランスクリプション・システムは、スピーチ信号をテキストメッセージにトランスクライブ（transcribe）する。トランスクライブされたテキストメッセージを、ＰＣＤに戻す。テキストメッセージは、あらゆるトランスクリプションエラーを訂正するためにＰＣＤにおいて編集され、そして、種々のアプリケーションにおいて使用される。一つの例示的なアプリケーションにおいて、編集されたテキストメッセージを、電子メールの形において電子メールの受信者に送信する。

【０００６】
テキストを生成する別の例示的な方法において、ＰＣＤにより生成されるスピーチ信号を、サーバーにて受信する。スピーチ信号を、サーバーに置かれたスピーチ・トゥ・テキスト・トランスクリプション・システムを使用することによって、テキストメッセージにトランスクライブする。次に、テキストメッセージを、ＰＣＤに送信する。加えて、さらに一つの実施例において、トランスクリプション処理は、話された単語のスピーチ認識に対するいく通りかの候補のリストを生成することを含む。このいく通りかの候補のリストを、トランスクライブされる単語とともに、サーバーによってＰＣＤに送信する。

【０００７】
前述の発明の概要は、同様にして以下の詳細な説明も、添付した図面とともに読むときに、よりよく理解される。パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを説明する目的として、それについて図面の例示的な構成を示すが、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションは、開示される特定の方法および手段に制限されない。

【図面の簡単な説明】

【０００８】
【図１】本発明の一実施形態に係るパーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプション・システムを組み入れる例示的な通信システム１００を示す図である。
【図２】本発明の一実施形態に係るスピーチ・トゥ・テキスト・トランスクリプションを使用してテキストを生成する、図１の通信システム上に実装される方法一のステップについての例示的なシーケンスを示す図である。
【図３】本発明の一実施形態に係るパーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを実装する例示的なプロセッサの図である。
【図４】本発明の一実施形態に係るパーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを実装できる、適しているコンピューティング環境を表す図である。

【発明を実施するための形態】

【０００９】
以下に説明する種々の例示的な実施形態において、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプション・システムを、１つまたは複数のモバイルデバイスに通信連結される通信サーバーに収納する。モバイルデバイスに収納されるスピーチ認識システムとは違って、サーバーに置かれるスピーチ・トゥ・テキスト・トランスクリプション・システムは、サーバーにおける大きな、費用効率の高い、ストレージ容量および計算力の有用性のため、フィーチャーリッチ（feature-rich）でありおよび効率的である。本明細書においてＰＣＤ（personal communications device）というモバイルデバイスのユーザーは、例えば、電子メールのオーディオをＰＣＤの中へディクテートする。ＰＣＤは、ユーザーの音声をスピーチ信号にコンバートして、コンバートされたスピーチ信号を、サーバーに置かれたスピーチ・トゥ・テキスト・トランスクリプション・システ

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ムに送信する。スピーチ・トゥ・テキスト・トランスクリプション・システムは、スピーチ認識技術を使用することによって、スピーチ信号をテキストメッセージにトランスクライブする。次に、サーバーは、テキストメッセージを、ＰＣＤに送信する。テキストメッセージを受信すると、ユーザーは、テキストを利用する種々のアプリケーションにおいてテキストメッセージを使用する前に、間違ってトランスクライブされた単語の訂正を実行する。

【００１０】

例えば、一つの例示的なアプリケーションにおいて、編集されたテキストメッセージを使用して、電子メールの本文を構成して、次に、構成された電子メールの本文を、電子メールの受信者に送信する。代替のアプリケーションにおいて、編集されたテキストメッセージを、例えば本願発明の特許出願人の製品ＷＯＲＤなどのユーティリティにおいて使用する。さらに別のアプリケーションにおいて、編集されたテキストメッセージを、メモに挿入する。上記の例およびテキストを使用する上記の他の例は、当業者により理解されるであろう。したがって、本開示の範囲は、上記のすべての領域を網羅することを意図される。

【００１１】

上に説明した整理によって、いくつかの利点が与えられる。例えば、サーバーに置かれたスピーチ・トゥ・テキスト・トランスクリプション・システムは、ＰＣＤ内に収納された、より制限されたスピーチ認識システムと比べると、通常、中間から高位までの９０％の範囲に、単語認識の高い正確さを提供する費用効率の高いスピーチ認識システムを組み入れる。

【００１２】

さらに、スピーチ・トゥ・テキスト・トランスクリプション・システムによって生成されたテキストメッセージのわずかに間違った単語を編集するためにＰＣＤのキーパッドを使用することは、ＰＣＤのキーパッド上のキーを手動により下へ押すことによって電子メールメッセージのテキスト全体を入力することに比べて、より効率的であり、およびより望ましい。すぐれたスピーチ・トゥ・テキスト・トランスクリプション・システムによって、通常、間違った単語の数は、トランスクライブされたテキストメッセージの単語の総数の１０％よりも、より少ないであろう。

【００１３】

図１は、携帯電話の基地局１２０に置かれたサーバーに収納されたスピーチ・トゥ・テキスト・トランスクリプション・システム１３０を組み入れた例示的な通信システム１００を示す。携帯電話の基地局１２０によって、当業者において知られているように、携帯電話の通信サービスを種々のＰＣＤに提供する。提供された種々のＰＣＤの各々は、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０にアクセスする目的として、必要なときベースか連続ベースかにおいて、サーバー１２５に通信連結される。

【００１４】

ＰＣＤのわずかの不完全な例は、ＰＣＤ１０５、それはスマートフォンであり、ＰＣＤ１１０、それはＰＤＡ（personal digital assistant）であり、およびＰＣＤ１１５、それはテキスト入力機能を有する携帯電話である例を含む。ＰＣＤ１０５、スマートフォンは、携帯電話をコンピューターと組合せ、それによって電子メールを含む音声の機能を、同様にしてデータ通信の機能をも提供する。ＰＣＤ１１０、ＰＤＡは、データ通信用のコンピューターと、音声通信用の携帯電話と、例えばアドレス、約束、カレンダーおよびメモなどの個人的な情報を格納するためのデータベースとを組合せる。ＰＣＤ１１５、携帯電話は、音声通信を、同様にして例えばＳＭＳ（short message service）など、あるテキスト入力機能をも提供する。

【００１５】

一つの特定の例示的な実施形態において、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０を収納することに加えて、携帯電話の基地局１２０は、電子メールサービスを種々のＰＣＤに提供する電子メールサーバー１４５をさらに含む。同様に、

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携帯電話の基地局１２０を、例えばＰＳＴＮ　ＣＯ（Public Switched Telephone Network Central Office）１４０などの他のネットワークエレメントに通信連結し、およびオプションとしてＩＳＰ（Internet Service Provider）１５０に通信連結する。携帯電話の基地局１２０、電子メールサーバー１４５、ＩＳＰ１５０およびＰＳＴＮ　ＣＯ１４０の動作の詳細の記述を、ＰＣＤ用のスピーチ・トゥ・テキスト・トランスクリプション・システムの適切な側面についての主眼を維持するために、および当業者に知られている主題から生じるあらゆる注意散漫を避けるために、本明細書において提供しないことにする。実施例の構成において、ＩＳＰ１５０を、電子メールおよびトランスクリプション機能を処理するための電子メールサーバー１６２とスピーチ・トゥ・テキスト・トランスクリプション・システム１３０とを備える企業１５２に連結する。

【００１６】

スピーチ・トゥ・テキスト・トランスクリプション・システム１３０を、通信ネットワーク１００に置かれた、いくつかのいく通りかの場所に収納できる。例えば、最初の例示的な実施形態において、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０を、携帯電話の基地局１２０に置かれたセカンダリサーバー１３５に収納する。セカンダリサーバー１３５を、サーバー１２５に通信連結し、通信連結されたサーバー１２５は、本構成においてプライマリサーバーとして動作する。別の例示的な実施形態において、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０を、ＰＳＴＮ　ＣＯ１４０に置かれたーバ１５５に収納する。さらに別の例示的な実施形態において、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０を、ＩＳＰ１５０の設備に置かれたサーバー１６０に収納する。

【００１７】

上に述べたように、通常、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０は、スピーチ認識システムを含む。スピーチ認識システムは、スピーカーインディペンデントシステム（speaker-independent system）またはスピーカーディペンデントシステム（speaker-dependent system）であるとすることができる。スピーカーディペンデントシステムのとき、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０は、別個の単語の形か、または指定された段落の形かのいずれかにおいて、ＰＣＤユーザーに、いくつかの単語を話すように促すトレーニング機能を含む。話された単語を、このＰＣＤユーザーによる使用のために、単語についてのカスタマイズされたテンプレートとして格納する。加えて、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０は、各別個のＰＣＤユーザーと結びつけられた１つまたは複数のデータベースの形において、次に述べる、ユーザーによって好まれおよび一般に話される専門用語の単語についてのカスタマイズされたリスト、ユーザーによって使用される電子メールアドレスについてのリスト、ユーザーの１つまたは複数のコンタクトについての個人的な情報を有するコンタクトリストのうちの１つまたは複数をさらに組み入れることができる。

【００１８】

図２は、スピーチ・トゥ・テキスト・トランスクリプションを使用してテキストを生成するに、通信システム１００上に実装される方法のステップについての例示的なシーケンスを示す。この特別の例において、スピーチ・トゥ・テキスト・トランスクリプションを、電子サーバー１４５により電子メールを送信するために使用する。サーバー１２５は、携帯電話の基地局１２０に置き、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０を含む。２つの別々なサーバーを使用するよりもむしろ、オプションとして単独の統合サーバー２１０を使用して、サーバー１２５の機能を、同様にして電子メールサーバー１４５の機能をも組み入れることができる。結果として、上記の構成における統合サーバー２１０は、一般的に割り当てられたリソースを使用することによって、スピーチ・トゥ・テキスト・トランスクリプションと、同様にして電子メールサーバーとも結びつけられた動作を実行する。

【００１９】

動作のステップについてのシーケンスは、ＰＣＤユーザーが電子メールをＰＣＤ１０５

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の中へディクテートするステップ１により開始する。ディクテートされたオーディオは、電子メールに付随するいくつかのいく通りかの素材のうちの１つであるとすることができる。上記の素材のわずかの不完全な例は、次を含む。すなわち、電子メールの本文の一部、電子メールの本文全体、件名テキスト、および１つまたは複数の電子メールアドレスである。ディクテートされたオーディオを、ＰＣＤ１０５において電気のスピーチ信号に変換し、ワイヤレス送信に対して適切にエンコードし、そして携帯電話の基地局１２０に送信し、送信された信号をスピーチ・トゥ・テキスト・トランスクリプション・システム１３０にルーティングする。

【００２０】

スピーチ・トゥ・テキスト・トランスクリプション・システム１３０は、スピーチ認識システム（図示せず）およびテキストジェネレータ（図示せず）を通常含み、スピーチ信号をテキストデータにトランスクライブする。ステップ２において、テキストデータを、ワイヤレス送信に対して適切にエンコードし、およびＰＣＤ１０５へ戻すよう送信する。ステップ２を自働処理において実装でき、テキストメッセージを、ＰＣＤ１０５のユーザーがあらゆる行動を実行することなしに、ＰＣＤ１０５へ自動的に送信する。代替の処理において、ＰＣＤユーザーは、例えば、あるキーをアクティベートすることによって、テキストメッセージをスピーチ・トゥ・テキスト・トランスクリプション・システム１３０からＰＣＤ１０５へダウンロードするために、ＰＣＤ１０５を手動により操作しなければならない。テキストメッセージは、このテキストメッセージのダウンロード要求がＰＣＤユーザーによって行われるまでＰＣＤ１０５に送信されない。

【００２１】

ステップ３において、ＰＣＤユーザーは、テキストメッセージを編集し、および適切に、電子メールメッセージの中へ編集したテキストメッセージの書式設定をする。いったん電子メールが適切に書式設定をされると、ステップ４において、ＰＣＤユーザーは、電子メールの「送信」ボタンをアクティベートして、電子メールを、電子メールサーバー１４５へワイヤレスに送信し、適した電子メールの受信者に転送するために、電子メールサーバー１４５からインターネット（図示せず）に連結する。

【００２２】

上に述べた４つのステップを、例として動作のいくつかの代替モードを使用して、（電子メールに制限されない）より一般的な方法においてさらに詳細に説明するものである。

【００２３】

（遅延送信モード）

本動作モードにおいて、ＰＣＤユーザーは、スピーチからテキストにトランスクライブされるのが望まれる素材を発音する。発音されたテキストを、ＰＣＤの適しているストレージバッファーに格納する。例えば、上記は、話者の音声をデジタル化するアナログ・トゥ・デジタル・エンコーダーを使用することによって実行でき、デジタル・メモリ・チップにデジタル化されたデータを格納することがあとに続くことができる。デジタル化および格納の処理を、ＰＣＤユーザーが素材全体を発音し終えるまで実行する。このタスクが完了すると、ＰＣＤユーザーは、ワイヤレス送信に適している書式設定をした後、データ信号の形におけるデジタル化されたデータを携帯電話の基地局１２０に送信するために、ＰＣＤ上の「トランスクライブ」キーをアクティベートする。トランスクライブキーを、ハードキーとして、または例えばＰＣＤのディスプレイ上のアイコンの形において表示されるソフトキーとして実装できる。

【００２４】

（漸次送信モード）

本動作モードにおいて、ＰＣＤユーザーは、ＰＣＤ１０５から携帯電話の基地局１２０へデータ形式において頻繁におよび定期的に送信する素材を発音する。例えば、発音された素材を、ＰＣＤユーザーがＰＣＤの中へ話す間休止するときはいつも、スピーチ信号の一部として送信できる。上記の休止は、例えば、文の最後に起こることがある。スピーチ・トゥ・テキスト・トランスクリプション・システム１３０は、スピーチ信号についての

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その特定の部分をトランスクライブし、およびＰＣＤユーザーが次の文を話しているときでさえ、対応するテキストメッセージを戻すことができる。結果として、トランスクリプション処理を、ユーザーが素材全体を完全に話し終えなければならない遅延送信モードよりも、本漸次送信モードのほうがより速く実行することができる。

【００２５】

一つの代替の実施例において、漸次送信モードを、遅延送信モードと選択的に組合せることができる。上記の組合せのモードにおいて、テンポラリ・バッファー・ストレージ（temporary buffer storage）を使用して、ＰＣＤ１０５からの断続的な送信の前に、発音された素材の（例えば、一つの文よりも長い）ある部分を格納する。上記の実施例に対して要求されるテンポラリ・バッファー・ストレージは、送信前に素材全体を格納しなければならない遅延送信モードに対して要求されるテンポラリ・バッファー・ストレージと比べると、より小さくすることができる。

【００２６】

（ライブ送信モード）

本動作モードにおいて、ＰＣＤユーザーは、ＰＣＤ上の「トランスクリプション要求」キーをアクティベートする。トランスクリプション要求キーを、ハードキー、または例えばＰＣＤのディスプレイ上のアイコンの形において表示されるソフトキーとして実装できる。トランスクリプション要求キーをアクティベートすると、通信リンクを、ＰＣＤ１０５と（スピーチ・トゥ・テキスト・トランスクリプション・システム１３０を収納する）サーバー１２５との間に、例えばトランスポート・コントロール・フォーマット（Transport Control Format）（ＴＣＰ／ＩＰ）に埋め込まれたＩＰ（Internet Protocol）データを使用して設定する。上記の通信リンクは、パケット伝送リンクといわれ、当業者において知られており、通常、インターネットに関係するデータパケットを転送するために使用される。例示的な実施形態において、トランスクリプション要求キーがアクティベートされると、ＩＰ呼よりもむしろ電話呼を、例えば回線交換呼（例えば、標準の電話通信呼）などを、携帯電話の基地局１２０によってサーバー１２５に提供する。

【００２７】

パケット伝送リンクを、サーバー１０５が使用して、ＰＣＤ１０５からのＩＰデータパケットを受信するサーバー１２５の迅速さにＰＣＤ１０５へＡＣＫを送る。ＩＰデータパケットは、ユーザーが発音した素材からデジタル化されたデジタルデータを伝え、サーバー１２５において受信され、トランスクリプションのためにスピーチ・トゥ・テキスト・トランスクリプション・システム１３０に連結される前に適切にデコードされる。トランスクライブされたテキストメッセージを、遅延送信モードか、は漸次送信モードかのいずれかにおいてＰＣＤへ伝え、再びＩＰデータパケットの形にすることができる。

【００２８】

（スピーチ・トゥ・テキスト・トランスクリプション）

上に述べたように、スピーチ・トゥ・テキスト・トランスクリプションを、通常、スピーチ認識システムを使用することによりスピーチ・トゥ・テキスト・トランスクリプション・システム１３０において実行する。スピーチ認識システムは、スピーチ認識のためにいくつかのいく通りかの候補の各々に対して、そのようないく通りかの候補が存在しているとき、信頼要因を代表にすることにより個々の単語を認識する。例えば、話された単語「ｔａｕｔ」は、例えば「ｔａｕｇｈｔ」、「ｔｈｏｕｇｈｔ」、「ｔｏｔｅ」、および「ｔａｕｔ」などのスピーチ認識のためにいくつかのいく通りかの候補を有することができる。スピーチ認識システムは、認識の正確さにこれらのいく通りかの候補の各々と信頼要因とを結びつける。上記の特定の例において、「ｔａｕｇｈｔ」、「ｔｈｏｕｇｈｔ」、「ｔｏｔｅ」、および「ｔａｕｔ」に対する信頼要因は、それぞれ７５％、５０％、２５％、および１０％であるとすることができる。スピーチ認識システムは、もっとも高い信頼要因を有する候補を選択し、および話された単語をテキストにトランスクライブするために、選択した候補を使用する。結果として、上記の例において、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０は、話された単語「ｔａｕｔ」を逐語的

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な単語「ｔａｕｇｈｔ」にトランスクライブする。

【００２９】

上記のトランスクライブされた単語は、図２のステップ２における携帯電話の基地局１０５からＰＣＤ１０５へのトランスクライブされたテキストの一部として送信され、明らかに正しくない。一つの例示的なアプリケーションにおいて、ＰＣＤユーザーは、自分のＰＣＤ１０５上にこの間違った単語に気付き、および「ｔａｕｇｈｔ」を削除し「ｔａｕｇｈｔ」を「ｔａｕｔ」と置き替えることによって単語を手動により編集するが、この場合、ＰＣＤ１０５のキーボード上において単語「ｔａｕｔ」をタイプすることによって実行する。別の例示的なアプリケーションにおいて、１つまたは複数のいく通りかの候補の単語（「ｔｈｏｕｇｈｔ」、「ｔｏｔｅ」、および「ｔａｕｔ」）を、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０によってトランスクライブされた単語「ｔａｕｇｈｔ」にリンクさせる。上記の２つめの場合において、ＰＣＤユーザーは、間違った単語に気付き、および手動により取替えの単語をタイプして入力することよりもむしろ、いく通りかの候補の単語をメニューから選択する。メニューを、例えば、カーソルを間違ってトランスクライブされた単語「ｔａｕｇｈｔ」の上に置くことによって、ドロップダウンメニューとして表示できる。いく通りかの単語を、カーソルをトランスクライブされた単語の上に置くときに自動的に表示できるか、またはカーソルを間違ってトランスクライブされた単語の上に置いた後にＰＣＤ１０５の適切なハードキーまたはソフトキーをアクティベートすることによって表示できる。例示的な実施形態において、いく通りかの一連の単語（語句）を、自動的に表示することができ、およびユーザーは、適切な語句を選択することができる。例えば、単語「ｔａｕｇｈｔ」を選択すると、語句「Ｒｏｂ　ｔａｕｇｈｔ」、「ｒｏｐｅ　ｔａｕｇｈｔ」、「Ｒｏｂ　ｔａｕｔ」、および「ｒｏｐｅ　ｔａｕｔ」を表示することができ、およびユーザーは、適切な語句を選択することができる。さらに別の例示的な実施形態において、適切な語句を、信頼のレベルのとおりに自動的に表示するまたは表示することを保留することができる。例えば、スピーチ・トゥ・テキスト・トランスクリプション・システムは、英語の使用の一般的なパターンに基づいて、語句「Ｒｏｂ　ｔａｕｔ」および「ｒｏｐｅ　ｔａｕｇｈｔ」が正しいことの信頼を低くしてもよく、およびそれらの語句を表示することを保留することができるだろう。さらにいっそうの例示的な実施形態において、スピーチ・トゥ・テキスト・トランスクリプション・システムは、以前の選択から学習することができる。例えば、スピーチ・トゥ・テキスト・トランスクリプション・システムは、辞書の単語、辞書の語句、コンタクトネーム、電話番号などを学習することができるだろう。加えて、テキストを、以前のビヘイビアーに基づいて予測することができるだろう。例えば、ピーチ・トゥ・テキスト・トランスクリプション・システムは、「４２」から始まる電話番号の次に続く混同するスピーチを「聞く」ことがある。ピーチ・トゥ・テキスト・トランスクリプション・システムは、システムの演繹的な情報（例えば、学習された情報またはシード処理された情報）に基づいて、そのエリアコードが４２５であると推定することができるだろう。従って、４２５を有する種々の番号の組合せを、表示することができるだろう。例えば、「４２５－×××－××××」を、表示することができるだろう。エリアと市内局番との種々の組合せを、表示することができるだろう。例えば、４２５のエリアコードを有するシステムに格納された唯一の番号が、７０７か６０６かのいずれかの市内局番を有する場合、「４２５－７０７－××××」および「４２５－６０６－××××」を表示することができるだろう。ユーザーが表示された番号の１つを選択するので、追加の番号を表示することができるだろう。例えば、「４２５－６０６―××××」を選択する場合、４２５－６０６から始まるすべての番号を表示することができるだろう。

【００３０】

上に説明したメニュー主導の訂正機能に加えて、またはその代わりに、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０は、ある方法において、例えば、疑問の余地がある単語に赤線により下線を引くことによって、または疑問の余地がある単語のテキストを赤色に塗ることによって、疑問の余地があるトランスクライブされた単語を

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強調表示することによって、単語の訂正機能を提供できる。代替の例示的な実施形態において、ＰＣＤは、ある方法において、例えば、疑問の余地がある単語に赤線により下線を引くことによって、または疑問の余地がある単語のテキストを赤色に塗ることによって、疑問の余地があるトランスクライブされた単語を強調表示することによって、単語の訂正機能を提供できる。

【００３１】

さらに、上に説明した訂正処理を、カスタマイズされた専門用語の単語のリストを生成するために、またはカスタマイズされた単語の辞書を作成するために利用することができる。カスタマイズされたリストかカスタマイズされた辞書のいずれかまたは両方を、スピーチ・トゥ・テキスト・トランスクリプション・システム１３０かＰＣＤ１０５のいずれかまたは両方に格納できる。カスタマイズされた専門用語の単語のリストを使用して、特定のユーザーに特有の、ある単語を格納できる。例えば、上記の単語は、個人名または外国語の単語を含むことができる。カスタマイズされた辞書を、例えば、ＰＣＤユーザーが、あるトランスクライブされた単語を、ＰＣＤユーザーにより提供された取替えの単語によって今後自動的に訂正しなければならないことを示す場合に、作成できる。

【００３２】

図３は、スピーチ・トゥ・テキスト・トランスクリプション１３０を実装する例示的なプロセッサ３００の図である。プロセッサ３００は、処理部３０５、メモリ部３５０、および入力／出力部３６０を備える。処理部３０５、メモリ部３５０、および入力／出力部３６０を、互いに連結して（連結は図３に図示せず）、その間において通信を可能にする。入力／出力部３６０は、上に説明したようなスピーチ・トゥ・テキスト・トランスクリプションを実行するために利用されるコンポーネントを提供および／または受信する性能がある。例えば、入力／出力部３６０は、携帯電話の基地局とスピーチ・トゥ・テキスト・トランスクリプション１３０との間の通信連結および／またはサーバーとスピーチ・トゥ・テキスト・トランスクリプション１３０との間の通信連結を提供する性能がある。

【００３３】

プロセッサ３００を、クライアントプロセッサ、サーバープロセッサ、および／または分散プロセッサとして実装することができる。基本構成において、プロセッサ３００は、少なくとも１つの処理部３０５およびメモリ部３５０を含むことができる。メモリ部３５０は、スピーチ・トゥ・テキスト・トランスクリプションと連係して利用されるあらゆる情報を格納することができる。精密な構成およびプロセッサの種類に依存して、メモリ部３５０は、（例えばＲＡＭなどの）揮発性３２５、（例えばＲＯＭ、フラッシュメモリなどの）不揮発性３３０、またはそれの組合せであるとすることができる。プロセッサ３００は、追加された特徴／機能を有することができる。例えば、プロセッサ３００は、制限されないが、磁気または光学のディスク、テープ、フラッシュ、スマートカード、またはそれの組合せを含む追加された記憶装置（取外し可能な記憶装置３１０および／または固定記憶装置３２０）を含むことができる。コンピューター記憶媒体、例えばメモリ部３１０、３２０、３２５および３３０などは、例えばコンピューター読取り可能な命令、データ構造、プログラムモジュール、または他のデータなどの情報を格納するあらゆる方法またはテクノロジーにおいて実装される揮発性および不揮発性の、取外し可能なおよび固定の媒体を含む。コンピューター記憶媒体は、制限されないが、ＲＡＭ、ＲＯＭ、ＥＥＰＲＯＭ、フラッシュメモリまたは他のメモリテクノロジー、ＣＤ－ＲＯＭ、ＤＶＤ（digital versatile disk）または他の光記憶装置、磁気カセット、磁気テープ、磁気ディスク記憶装置または他の磁気記憶装置デバイス、ＵＳＢ（universal serial bus）互換性メモリ、スマートカード、または望みの情報を格納するために使用することができ、およびプロセッサ３００がアクセスすることができる他のあらゆる媒体含む。上記のあらゆるコンピューター記憶媒体は、プロセッサ３００の一部であるとすることができる。

【００３４】

さらに、プロセッサ３００は、プロセッサ３００に、例えば、他のモデムなどの他の装置と通信することを可能にする（複数の）通信接続３４５を含むことができる。（複数の

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）通信接続３４５は、通信媒体の例である。通常、通信媒体は、コンピューター読取り可能な命令、データ構造、プログラムモジュール、または例えば搬送波もしくは他の転送メカニズムなどの変調データ信号における他のデータ、およびあらゆる情報伝達媒体を含む。用語の「変調データ信号」は、１つまたは複数のその特性セットを有する信号を、または信号の情報のエンコードに応じた上記の方法において変更される信号を意味する。例として、制限されないが、通信媒体は、例えば有線ネットワークまたは直接有線接続などの有線媒体と、例えば音、ＲＦ、赤外線などの無線媒体と、他の無線媒体とを含む。本明細書において使用される用語のコンピューター読取り可能な媒体は、記憶媒体と通信媒体との両方を含む。さらに、プロセッサ３００は、例えばキーボード、マウス、ペン、音声入力装置、タッチ入力デバイスなどの（複数の）入力デバイス３４０を有することができる。さらに、例えばディスプレイ、スピーカー、プリンターなどの出力装置３３５を含むことができる。

【００３５】

１つの統合されたブロックとして図３に示すが、プロセッサ３００を、例えば、複数のＣＰＵ（central processing unit）として実装される処理部３０５を有する分散装置として実装できることを理解されるであろう。上記の１つの実装において、プロセッサ３００の第１の部分をＰＣＤ１０５に置くことができ、第２の部分をスピーチ・トゥ・テキスト・トランスクリプション・システム１３０に置くことができ、および第３の部分をサーバー１２５に置くことができる。種々の部分を、ＰＣＤ用のスピーチ・トゥ・テキスト・トランスクリプションと結びつけられた種々の機能を実行するように構成する。例えば、第１の部分を、ＰＣＤ上にドロップダウン・メニュー・ディスプレイを提供するために、ならびに例えば「トランスクライブ」キーおよび「トランスクリプション要求」キーなどの、あるソフトキーをＰＣＤのディスプレイ上に提供するために使用できる。第２の部分を、例えば、スピーチ認識を実行するために、代替の候補をトランスクライブされた単語に結びつけるために使用できる。第３の部分を、例えば、サーバー１２５に置かれたモデムをスピーチ・トゥ・テキスト・トランスクリプション・システム１３０に連結するために使用できる。

【００３６】

図４および以下の解説により、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを実装できる、適しているコンピューティング環境の簡潔な一般的な説明を与える。必要とはされないけれども、スピーチ・トゥ・テキスト・トランスクリプションの種々の側面を、例えば、クライアントワークステーションまたはサーバーなどのコンピューターによって実行される、例えば、プログラムモジュールなどのコンピューター実行可能な命令の一般的なコンテキストにおいて説明できる。一般に、プログラムモジュールは、ルーチン、プログラム、オブジェクト、コンポーネント、データ構造、および特定のタスクを実行するまたは特定の抽象データ型を実装するものなどを含む。さらに、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションの実装を、ハンド・ヘルド・デバイス、マルチ・プロセッサ・システム、マイクロプロセッサベースまたはプログラム可能な家庭用電化製品、ネットワークＰＣ、ミニコンピューター、メインフレームコンピューターなどを含む他のコンピューターシステム構成により実践できる。さらに、またパーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを、通信ネットワークにリンクするリモート処理装置によってタスクを実行する分散コンピューティング環境において実践できる。分散コンピューティング環境において、プログラムモジュールを、ローカルとリモートとの両方のメモリ記憶装置に置くことができる。

【００３７】

コンピューターシステムを、３つのコンポーネントグループに大ざっぱに分ける。すなわち、ハードウェアコンポーネント、ハードウェア／ソフトウェア・インターフェース・システム・コンポーネント、およびアプリケーション・プログラム・コンポーネント（「ユーザーコンポーネント」または「ソフトウェアコンポーネント」ともいう）である。コ

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ンピューターシステムの種々の実施形態において、ハードウェアコンポーネントは、中央処理装置（ＣＰＵ）４２１、メモリ（ＲＯＭ４６４とＲＡＭ４２５との両方）、ＢＩＯＳ（basic input/output system）４６６、ならびに例えばキーボード４４０、マウス４４２、モニタ４４７、および／またはプリンター（図示せず）などの種々のＩ／Ｏ（input/output）装置を備えることができる。ハードウェアコンポーネントは、コンピューターシステムに対する基本の物理的なインフラストラクチャを備える。

【００３８】

アプリケーション・プログラム・コンポーネントは、制限されないが、コンパイラ、データベースシステム、ワードプロセッサ、ビジネスプログラム、ビデオゲームなどを含む種々のソフトウェアプログラムを備える。アプリケーションプログラムによって、問題を解決して、解決策を与えて、種々のユーザー（マシン、他のコンピューターシステム、および／またはエンドユーザー）に対してデータを処理するためにコンピュータリソースを利用する手段を提供する。例示的な実施形態において、アプリケーションプログラムは、上に説明したパーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションに結びつけられた機能を実行する。

【００３９】

ハードウェア／ソフトウェア・インターフェース・システム・コンポーネントは、オペレーティングシステムを備え（およびいくつかの実施形態において、単独により構成されることもあり）、ほとんどの場合には、オペレーティングシステム自体はシェルとカーネルとを備える。「ＯＳ（operating system）」は、アプリケーションプログラムとコンピューターハードウェアとの間の媒介として動作する特別なプログラムである。さらにハードウェア／ソフトウェア・インターフェース・システム・コンポーネントは、ＶＭＭ（virtual machine manager）、ＣＬＲ（Common Language Runtime）もしくはそれと機能的に同等のもの、ＪＶＭ（Java Virtual Machine）もしくはそれと機能的に同等のもの、またはコンピューターシステムのオペレーティングシステムに代わるもしくは加わる上記の他のソフトウェアコンポーネントを備えることができる。ハードウェア／ソフトウェア・インターフェース・システムの目的は、ユーザーがアプリケーションプログラムを実行できる環境を提供することである。

【００４０】

一般に、ハードウェア／ソフトウェア・インターフェース・システムは、起動のときにコンピューターシステムにロードされ、その後、コンピューターシステムのすべてのアプリケーションプログラムを管理する。アプリケーションプログラムは、ＡＰＩ（application program interface）によってサービスを要求することによって、ハードウェア／ソフトウェア・インターフェース・システムと双方向に情報伝達をする。いくつかのアプリケーションプログラムは、エンドユーザーに、例えばコマンド言語またはＧＵＩ（graphical user interface）などのユーザーインターフェースによってハードウェア／ソフトウェア・インターフェース・システムと双方向に情報伝達をすることを可能にする。

【００４１】

従来、ハードウェア／ソフトウェア・インターフェース・システムは、アプリケーションに対していろいろなサービスを実行する。複数のプログラムを同時に実行することができるマルチタスク処理のハードウェア／ソフトウェア・インターフェース・システムにおいて、ハードウェア／ソフトウェア・インターフェース・システムは、別のアプリケーションに順番に切替える前に、どのアプリケーションをどのような順序において実行すべきか、および各アプリケーションにどのくらいの時間を見越しておくべきかを決定する。さらに、ハードウェア／ソフトウェア・インターフェース・システムは、複数のアプリケーション間の内部メモリを共有することを管理し、および例えばハードディスク、プリンター、ダイアルアップポートなど付随するハードウェア装置に対する入出力を処理する。さらに、ハードウェア／ソフトウェア・インターフェース・システムは、動作の状態および生じたかもしれないあらゆるエラーについてのメッセージを各アプリケーション（および、ある場合には、エンドユーザー）に送信する。さらに、ハードウェア／ソフトウェア・

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インターフェース・システムは、バッチジョブ（例えば、印刷）の管理を除去することができるので、アプリケーションの開始をこの仕事から解放して、他の処理および／または動作を再開できる。さらに、並行処理を提供することができるコンピューター上、ハードウェア／ソフトウェア・インターフェース・システムは、プログラムの分割を管理するので、一度に２つ以上のプロセッサ上において、実行する。

【００４２】

ハードウェア／ソフトウェア・インターフェース・システム・シェル（「シェル」という）は、ハードウェア／ソフトウェア・インターフェース・システムに対して双方向のエンドユーザーインタフェースである。（さらに、シェルは、「コマンドインタプリター」またはオペレーティングシステムにおいて、「オペレーティング・システム・シェル」ということがある）。シェルは、アプリケーションプログラムおよび／またはエンドユーザーによって直にアクセス可能であるハードウェア／ソフトウェア・インターフェース・システムの外側のレイヤーである。シェルとは対照的に、カーネルは、ハードウェアコンポーネントと直に双方向に情報伝達をするハードウェア／ソフトウェア・インターフェース・システムの最も内部のレイヤーである。

【００４３】

図４に示すように、例示的な汎用コンピューティングシステムは、中央処理装置４２１、システムメモリ４６２、およびシステムメモリを含む種々のシステムコンポーネントを中央処理装置４２１に連結するシステムバス４２３を含む従来のコンピューティングデバイス４６０などを含む。システムバス４２３は、メモリバスまたはメモリコントローラ、周辺機器バス、およびいろいろなバスアーキテクチャのいずれかを使用するローカルバスを含むいくつかの種類のバス構造のいずれかであることができる。システムメモリは、ＲＯＭ（read only memory）４６４およびＲＡＭ（random access memory）４２５を含む。例えば起動の間など、コンピューティングデバイス４６０の中の要素間の情報を転送するのに役立つ基本ルーチンを含む、ＢＩＯＳ（basic input/output system）４６６を、ＲＯＭ４６４に格納する。さらに、コンピューティングデバイス４６０は、ハードディスク（ハードディスクは図示せず）に対する読取りおよび書込みのためのハード・ディスク・ドライブ４２７、取外し可能な磁気ディスク４２９（例えば、フロッピー（登録商標）ディスク、取外し可能な記憶装置）に対する読取りおよび書込みのための磁気ディスクドライブ４２８（例えば、フロッピー（登録商標）ドライブ）、および例えばＣＤ　ＲＯＭまたは他の光媒体などの取外し可能な光ディスク４３１に対する読取りおよび書込みのための光ディスクドライブ４３０を含むことができる。ハード・ディスク・ドライブ４２７、磁気ディスクドライブ４２８、および光ディスクドライブ４３０を、ハード・ディスク・ドライブ・インターフェース４３２、磁気ディスク・ドライブ・インターフェース４３３、および光ディスク・ドライブ・インターフェース４３４によってシステムバス４２３にそれぞれ接続する。ドライブおよびそれらに結びつけられたコンピューター読取り可能な媒体は、コンピューター読取り可能な命令、データ構造、プログラムモジュール、およびコンピューティングデバイス４６０用の他のデータについての不揮発性記憶装置を提供する。本明細書において説明される例示的な環境は、ハードディスク、取外し可能な磁気ディスク４２９、および取外し可能な光ディスク４３１を用いるが、例えば磁気カセット、フラッシュ・メモリ・カード、デジタル・ビデオ・ディスク、ベルヌーイカートリッジ、ＲＡＭ（random access memory）、ＲＯＭ（read only memory）など、コンピューターによりアクセス可能なデータを格納できる他の種類のコンピューター読取り可能な媒体を例示的なオペレーティング環境においてさらに使用することができることを当業者は理解するべきである。同様に、例示的な環境は、例えば熱センサー、セキュリティシステムまたは火災警報システムなどの多くの種類の監視装置、および他の情報のリソースを含むことができる。

【００４４】

多数のプログラムモジュールを、オペレーティングシステム４３５、１つまたは複数のアプリケーションプログラム４３６、他のプログラムモジュール４３７、およびプログラ

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ムデータ４３８を含む、ハードディスク４２７、磁気ディスク４２９、光ディスク４３１、ＲＯＭ４６４上、またはＲＡＭ４２５に格納することができる。ユーザーは、例えばキーボード４４０およびポインティングデバイス４４２（例えば、マウス）などの入力装置によって、コマンドおよび情報をコンピューティングデバイス４６０に入力できる。他の入力装置（図示せず）は、マイクロフォン、ジョイスティック、ゲームパッド、サテライトディスク、スキャナなどを含むことができる。これらおよび他の入力装置を、システムバスに連結されるシリアル・ポート・インターフェース４４６によって処理デバイス４２１に接続することが多いが、例えばパラレルポート、ゲームポート、またはＵＳＢ（universal serial bus）などの他のインターフェースによって連結することができる。さらに、モニタ４４７または他の種類のディスプレイデバイスを、例えばビデオアダプター４４８などのインターフェースによってシステムバス４２３に接続する。モニタ４４７に加えて、通常、コンピューティングデバイスは、例えばスピーカーおよびプリンターなどの他の周辺機器出力装置（図示せず）を含む。さらに、図４の例示的な環境は、ホストアダプター４５５、ＳＣＳＩ（Small Computer System Interface）バス４５６、およびＳＣＳＩバス４５６に接続される外部記憶装置４６２を含む。

【００４５】

コンピューティングデバイス４６０は、例えばリモートコンピューター４４９などの１つまたは複数のリモートコンピューターへの論理接続を使用して、ネットワーク環境において動作できる。リモートコンピューター４４９は、別のコンピューティングデバイス（例えば、パーソナルコンピューター）、サーバー、ルータ、ネットワークＰＣ、ピアデバイス、または他の通常のネットワークノードであるとすることができ、メモリ記憶装置４５０（フロッピー（登録商標）ドライブ）のみを図４に図示したが、通常、上に説明したコンピューティングデバイス４６０関連の多くのまたはすべての要素を含むことができる。図４に表された論理接続は、ＬＡＮ（local area network）４５１およびＷＡＮ（wide area network）４５２を含む。上記のネットワーク環境は、職場、企業規模のコンピューターネットワーク、イントラネット、およびインターネットにおいてよく見られる。

【００４６】

ＬＡＮネットワーク環境において使用されるとき、コンピューティングデバイス４６０を、ネットワークインターフェースまたはアダプター４５３によってＬＡＮ４５１に接続する。ＷＡＮネットワーク環境において使用されるとき、コンピューティングデバイス４６０を、モデム４５４または例えばインターネットなどのワイドエリアネットワーク４５２に通信を確立する他の手段を含むことができる。モデム４５４を、内蔵または外付けであるとすることができ、シリアル・ポート・インターフェース４４６によってシステムバス４２３に接続する。ネットワーク環境において、コンピューティングデバイス４６０またはその一部関連の表されたプログラムモジュールを、リモートメモリ記憶装置に格納できる。図示されたネットワーク接続は、典型的な例であり、およびコンピューター間の通信リンクを確立する他の手段を使用できることを理解するであろう。

【００４７】

パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションの多くの実施形態は、特にコンピューター化されたシステムによく適していることが想像されるが、本明細書において、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを、上記の実施形態に制限することを少しも意図しない。それどころか、本明細書において使用されたのだが用語の「コンピューターシステム」は、上記のデバイスが電子的、機能的、論理的、または仮想的であろうとなかろうとまったく関係なく、情報を格納して処理できる、および／または格納された情報を使用してデバイス自体のビヘイビアーまたは実行を制御できるあらゆるすべてのデバイスを網羅することを意図する。

【００４８】

本明細書において説明された種々の技法を、ハードウェアまたはソフトウェア、適切な場合には両方の組合せに関連して実装することができる。従って、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションの方法および装置、またはある

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側面もしくはそれらの一部は、例えば、フロッピー（登録商標）ディスケット、ＣＤ－ＲＯＭ、ハードドライブ、または他のあらゆるマシン読取り可能な媒体などの有形媒体を包含したプログラムコード（すなわち、命令）の形をとることができ、本明細書において、プログラムコードを、例えば、コンピューターなどのマシンにロードして、マシンにより実行する場合に、マシンがパーソナル通信デバイスに対してスピーチ・トゥ・テキスト・トランスクリプションを実装する装置になる。

【００４９】

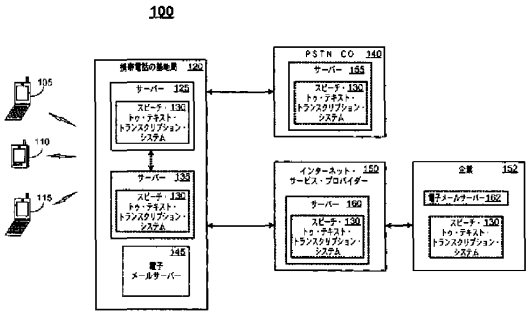
（複数の）プログラムを、望まれる場合に、アセンブリ言語またはマシン言語に実装することができる。とにかく、言語を、コンパイルされた言語または解釈された言語であるとすることができ、ハードウェアの実装と組合せることができる。さらに、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを実装する方法および装置を、例えば、電気配線またはケーブルを通じて、ファイバー光学によって、またはたのあらゆる伝送によってなど、ある伝送媒体を通じて送信されるプログラムコードの形を包含した通信により実践でき、プログラムコードを、本明細書において、例えば、ＥＰＲＯＭ、ゲートアレイ、ＰＬＤ（programmable logic device）、クライアントコンピューターなどのマシンが受信して、マシンにロードして実行する。汎用プロセッサに実装する場合に、プログラムコードは、汎用プロセッサを組合せて、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションの機能を起動するために動作する一意的な装置を提供する。加えて、いつもパーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションに関連して使用されるあらゆる記憶装置の技法を、ハードウェアとソフトウェアとの組合せであるとすることができる。

【００５０】

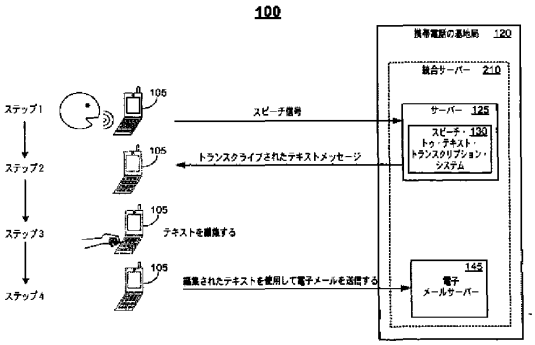
パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを、種々の図面の例示的な実施形態に関連して説明したが、他の同様の実施形態を使用することができ、または変更および追加を、パーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションと同じ機能を実行するために、それらから逸脱することなく、説明した実施形態に行うことができることを理解されるべきである。従って、本明細書において説明したパーソナル通信デバイス用のスピーチ・トゥ・テキスト・トランスクリプションを、あらゆる単一の実施形態に制限すべきではなく、むしろ添付されたクレームの通りの広さおよび範囲において解釈するべきである。

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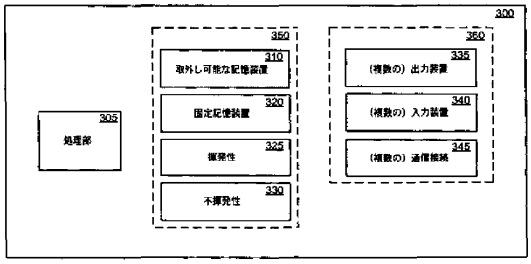
【図１】


100
携帯電話の基地局 120
サーバー 125
スピーチ・トゥ・テキスト・トランスクリプション・システム 130
サーバー 135
電子メールサーバー 145
PSTN CO 140
サーバー 155
インターネット・サービス・プロバイダー 150
サーバー 160
企業 152
電子メールサーバー 162
105
110
115

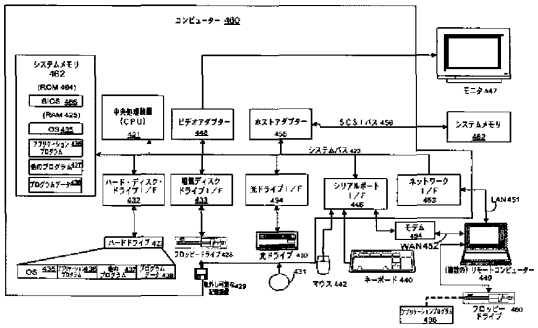
【図２】


100
携帯電話の基地局 120
統合サーバー 210
サーバー 125
スピーチ・トゥ・テキスト・トランスクリプション・システム 130
電子メールサーバー 145
105
ステップ1
ステップ2
ステップ3
ステップ4
スピーチ信号
トランスクライブされたテキストメッセージ
テキストを編集する
編集されたテキストを使用して電子メールを送信する

【図３】


300
350
310
取外し可能な記憶装置
320
固定記憶装置
325
揮発性
330
不揮発性
305
処理部
350
335
(複数の) 出力装置
340
(複数の) 入力装置
345
(複数の) 通信接続

【図４】


コンピューター 480
システムメモリ 482
(ROM 484)
BIOS 486
(RAM 485)
OS 435
アプリケーション・プログラム 436
他のプログラム 437
プログラムデータ 438
中央処理装置 (CPU) 481
ビデオアダプター 486
ホストアダプター 486
SCSI バス 456
システムメモリ 482
システムバス 478
ハード・ディスク・ドライブ・I/F 492
磁気ディスク・ドライブ・I/F 493
光ドライブ・I/F 494
シリアルポート I/F 446
ネットワーク I/F 462
LAN 451
モデム 454
WAN 452
ハードドライブ 427
フロッピー・ドライブ 428
光ドライブ 430
マウス 442
キーボード 440
(複数の) リモートコンピューター 449
プログラム 436
フロッピー・ドライブ 460

【国際調査報告】

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/074164

A. CLASSIFICATION OF SUBJECT MATTER

H04B 1/40(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 8 H04B 1/40

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models since 1975
Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS (KIPO internal), "speech-to-text","transcription","communication" and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2006-0001177 A (SK TELECOM CO., LTD.) 06 January 2006 See abstract, claims 1-18 and figures 1-8.	1-20
X	KR 10-2006-0066764 A (KTFREETEL CO., LTD.) 19 June 2006 See abstract, claims 1-6 and figures 1-8.	1-20
A	KR 10-2003-0097347 A (SAMSUNG ELECTRONICS CO., LTD.) 31 December 2003 See abstract, claims 1-4 and figures 1-4.	1-20
A	US 2005-0201540 A1 (FRED RAMPEY et al.) 15 September 2005 See abstract, claims 1-61 and figures 1-4.	1-20
A	US 2006-00217159 A1 (BRIAN D. WATSON) 28 September 2006 See abstract, claims 1-35 and figures 1-8.	1-20

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 DECEMBER 2008 (22.12.2008)	**23 DECEMBER 2008 (23.12.2008)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer SHIM, SONG HAK Telephone No. 82-42-481-8117

Form PCT/ISA/210 (second sheet) (July 2008)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2008/074164

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-2006-0001177 A	06.01.2006	None	
KR 10-2006-0066764 A	19.06.2006	None	
KR 10-2003-0097347 A	31.12.2003	CN 1468015 A US 2003-0236670 A1 US 7209877 B2	14.01.2004 25.12.2003 24.04.2007
US 2005-0201540 A1	15.09.2005	US 7130401 B2	31.10.2006
US 2006-00217159 A1	28.09.2006	JP 2008-534999 A WO 2006-101528 A1	28.08.2008 28.09.2006

Form PCT/ISA/210 (patent family annex) (July 2008)

フロントページの続き

(51)Int.Cl.	F I	テーマコード（参考）
Ｇ１０Ｌ　15/28　(2006.01)	Ｇ１０Ｌ　15/28　２１０Ａ	

(81)指定国 AP(BW,GH,GM,KE,LS,MW,MZ,NA,SD,SL,SZ,TZ,UG,ZM,ZW),EA(AM,AZ,BY,KG,KZ,MD,RU,TJ,TM),EP(AT,BE,BG,CH,CY,CZ,DE,DK,EE,ES,FI,FR,GB,GR,HR,HU,IE,IS,IT,LT,LU,LV,MC,MT,NL,NO,PL,PT,RO,SE,SI,SK,TR),OA(BF,BJ,CF,CG,CI,CM,GA,GN,GQ,GW,ML,MR,NE,SN,TD,TG),AE,AG,AL,AM,AO,AT,AU,AZ,BA,BB,BG,BH,BR,BW,BY,BZ,CA,CH,CN,CO,CR,CU,CZ,DE,DK,DM,DO,DZ,EC,EE,EG,ES,FI,GB,GD,GE,GH,GM,GT,HN,HR,HU,ID,IL,IN,IS,JP,KE,KG,KM,KN,KP,KR,KZ,LA,LC,LK,LR,LS,LT,LU,LY,MA,MD,ME,MG,MK,MN,MW,MX,MY,MZ,NA,NG,NI,NO,NZ,OM,PG,PH,PL,PT,RO,RS,RU,SC,SD,SE,SG,SK,SL,SM,ST,SV,SY,TJ,TM,TN,TR,TT,TZ,UA,UG,US,UZ,VC,VN,ZA,ZM,ZW

（特許庁注：以下のものは登録商標）
１．ＪＡＶＡ

(72)発明者 トーマス ダブリュ．ミレット
アメリカ合衆国 ９８０５２ ワシントン州 レッドモンド ワン マイクロソフト ウェイ マイクロソフト コーポレーション インターナショナル パテンツ内

Ｆターム(参考) 5D015 KK02
5K127 AA11 BA03 BA16 BB04 CA01 CA08 CA22 CA25 CB18 CB21
DA13 DA17 FA02 FA04 JA43 JA44 KA01 KA02 KA04 KA11
KA14 MA03 MA18
5K201 AA05 BD01 CA08 DA09 DC05 DC07 EA02 EA05 EC06 EC08
EC10 ED04 EE03 EE05 EE08 EF10

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Espacenet

Bibliographic data: JP2011504304 (A) — 2011-02-03

Speech-to-Text Transcription for Personal Communication Devices

Inventor(s):

Applicant(s):

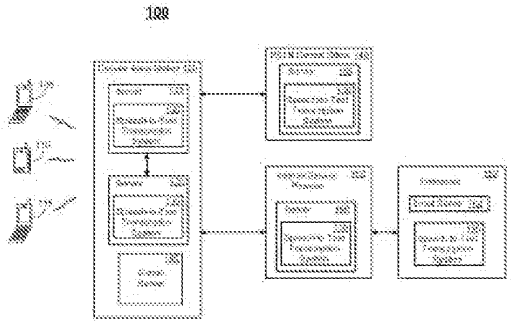
Classification: - international: *G06F3/16; G10L15/00; G10L15/28; H04M1/00; H04M11/00; H04M3/493*
- cooperative: **G10L15/30**

Application number: JP20100524907 20080825

Priority number (s): US20070854523 20070912 ; WO2008US74164 20080825

Also published as: US2009070109 (A1) WO2009035842 (A1) RU2010109071 (A) KR20100065317 (A) EP2198527 (A1) EP2198527 (A4) CN101803214 (A) less

Abstract not available for JP2011504304 (A)
Abstract of corresponding document: US2009070109 (A1)



A speech-to-text transcription system for a personal communication device (PCD) is housed in a communications server that is communicatively coupled to one or more PCDs. A user of the PCD, dictates an e-mail, for example, into the PCD. The PCD converts the user's voice into a speech signal that is transmitted to the speech-to-text transcription system located in the server. The speech-to-text transcription system transcribes the speech signal into a text message. The text message is then transmitted by the server to the PCD. Upon receiving the text message, the user carries out corrections on erroneously transcribed words before using the text message in various applications.

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Electronic Acknowledgement Receipt

EFS ID:	23913239
Application Number:	14691445
International Application Number:	
Confirmation Number:	8351
Title of Invention:	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE
First Named Inventor/Applicant Name:	Larry BALDWIN
Customer Number:	133759
Filer:	Hean Lee Koo/Susan Trader
Filer Authorized By:	Hean Lee Koo
Attorney Docket Number:	45HV-218492
Receipt Date:	28-OCT-2015
Filing Date:	20-APR-2015
Time Stamp:	11:55:16
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	45HV-218492_IDS_1449.pdf	39596 dc77d37f660769e7f2b685286159d09220748712	no	3

Warnings:	
Information:	

This is not an USPTO supplied IDS fillable form					
2	Foreign Reference	45HV-218492-CITE-38.pdf	915947 b08cdae7c5943ee1b707dbf9b4d8c2f886c5f089	no	21
Warnings:					
Information:					
3	Non Patent Literature	45HV-218492-CITE-39.pdf	243431 a1d387b68f96d8b70ff972580d5bb3a8c49729b9	no	3
Warnings:					
Information:					
4	Non Patent Literature	45HV-218492-CITE-40.pdf	381186 d52a9a7eb9273ffdb9e61b69f5bda78fb76f0d8d	no	4
Warnings:					
Information:					
5	Non Patent Literature	45HV-218492-CITE-41.pdf	457363 a43b2fda52fa920f317f75f797ad1fc557da262c	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	2037523		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/691,445	04/20/2015	Larry BALDWIN	090611-0438199

CONFIRMATION NO. 8351

133759
Sheppard Mullin Richter & Hampton LLP
12275 El Camino Real, Suite 200
San Diego, CA 92130

POA ACCEPTANCE LETTER

OC000000077755217

Date Mailed: 10/01/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/24/2015.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/mteklemichael/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/691,445	04/20/2015	Larry BALDWIN	090611-0438199

CONFIRMATION NO. 8351

909
Pillsbury Winthrop Shaw Pittman, LLP (NV)
PO Box 10500
McLean, VA 22102

POWER OF ATTORNEY NOTICE

OC000000077755190

Date Mailed: 10/01/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/24/2015.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/mteklemichael/

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	14/691,445
Filing Date	04/20/2015
First Named Inventor	Larry BALDWIN
Title	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE
Art Unit	
Examiner Name	
Attorney Docket Number	090611-0438199

SIGNATURE of Applicant or Patent Practitioner

Signature	/James G. Gatto/	Date (Optional)	September 24, 2015
Name	James G. Gatto	Registration Number	32,694
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 133759

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☑ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

VOICEBOX TECHNOLOGIES CORPORATION

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	
Name	MIKE KENNEWICK		
Title	CEO OF VOICEBOX TECHNOLOGIES CORPORATION		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	23591911
Application Number:	14691445
International Application Number:	
Confirmation Number:	8351
Title of Invention:	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE
First Named Inventor/Applicant Name:	Larry BALDWIN
Customer Number:	909
Filer:	James G. Gatto/Todd Yarborough
Filer Authorized By:	James G. Gatto
Attorney Docket Number:	090611-0438199
Receipt Date:	24-SEP-2015
Filing Date:	20-APR-2015
Time Stamp:	14:53:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	VoiceBox_AIA0082_POA_0438199.pdf	892209 c9ba48031e33b17e588d266f9787e96d2183665b	no	2

Warnings:	
Information:	

Total Files Size (in bytes):	892209

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/691,445	04/20/2015	Larry BALDWIN	090611-0438199

CONFIRMATION NO. 8351

909
Pillsbury Winthrop Shaw Pittman, LLP (NV)
PO Box 10500
McLean, VA 22102

PUBLICATION NOTICE

OC000000076850680

Title:SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

Publication No.US-2015-0228276-A1
Publication Date:08/13/2015

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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Page 1406

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/691,445

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/691,445	04/20/2015	2658	730	090611-0438199	20	2

CONFIRMATION NO. 8351

909
Pillsbury Winthrop Shaw Pittman, LLP (NV)
PO Box 10500
McLean, VA 22102

FILING RECEIPT

OC000000074920918

Date Mailed: 05/04/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Larry BALDWIN, Maple Valley, WA;
Tom FREEMAN, Mercer Island, WA;
Michael TJALVE, Bellevue, WA;
Blane EBERSOLD, Seattle, WA;
Chris WEIDER, Everett, WA;

Applicant(s)

VoiceBox Technologies Corporation, Bellevue, WA

Assignment For Published Patent Application

VoiceBox Technologies Corporation

Power of Attorney: The patent practitioners associated with Customer Number 00909

Domestic Priority data as claimed by applicant

This application is a CON of 13/987,645 08/19/2013 PAT 9015049
which is a DIV of 13/251,712 10/03/2011 PAT 8515765
which is a CON of 11/580,926 10/16/2006 PAT 8073681

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

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Exhibit 1003
Page 1408

If Required, Foreign Filing License Granted: 04/30/2015

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/691,445**

Projected Publication Date: 08/13/2015

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

Preliminary Class

704

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Exhibit 1003
Page 1409

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PTO/AIA/15 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	090611-0438199
First Named Inventor	Larry BALDWIN
Title	See Addendum
Express Mail Label No.	Via EFS Web

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. ☑ **Applicant asserts small entity status.** See 37 CFR 1.27
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. ☑ **Specification** [*Total Pages* 38] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. ☑ **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 3]
6. **Inventor's Oath or Declaration** [*Total Pages* 5] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. ☐ Newly executed (original or copy)
   b. ☑ A copy from a prior application (37 CFR 1.63(d))
7. ☑ **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   ☐ Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. ☐ Computer Readable Form (CRF)
   b. ☐ Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

ACCOMPANYING APPLICATION PAPERS

10. ☑ **Assignment Papers** (cover sheet & document(s)) Name of Assignee VoiceBox Technologies Corporation
11. ☑ **37 CFR 3.73(c) Statement** (*when there is an assignee*) ☑ **Power of Attorney**
12. ☐ **English Translation Document** (*if applicable*)
13. ☑ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
14. ☐ **Preliminary Amendment**
15. ☐ **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. ☐ **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. ☐ **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. ☐ **Other:**

***Note**: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

☑ The address associated with Customer Number: 00909 **OR** ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/Ngai B. Zhang/	Date	April 20, 2015
Name (Print/Type)	Ngai B. Zhang	Registration No. (Attorney/Agent)	65,473

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ADDENDUM 1

SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	090611-0438199
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Larry		BALDWIN	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Maple Valley	State/Province	WA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	25498 S.E. 274th Place		
Address 2			
City	Maple Valley	State/Province	WA
Postal Code	98038	Country i	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Tom		FREEMAN	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Mercer Island	State/Province	WA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	6735 83rd Avenue S.E		
Address 2			
City	Mercer Island	State/Province	WA
Postal Code	98040	Country i	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		TJALVE	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	090611-0438199
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE	

City	Bellevue	State/Province	WA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	14904 SE 47th Court		
Address 2			
City	Bellevue	State/Province	WA
Postal Code	98006	Country i	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Blane		EBERSOLD	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Seattle	State/Province	WA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	4721 Admiral Way S.W.		
Address 2			
City	Seattle	State/Province	WA
Postal Code	98116	Country i	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Chris		WEIDER	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Everett	State/Province	WA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	2618 Grand Avenue		
Address 2	#B-508		
City	Everett	State/Province	WA
Postal Code	98201	Country i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	090611-0438199
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE	

Customer Number	00909		
Email Address	Docket_ip@pillsburylaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE		
Attorney Docket Number	090611-0438199	**Small Entity Status Claimed**	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	**Suggested Figure for Publication (if any)**	

Filing By Reference :

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	00909		

PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	090611-0438199
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE	

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	13/987645	2013-08-19

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/987645	Division of	13/251712	2011-10-03	8515765	2013-08-20

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/251712	Continuation of	11/580926	2006-10-16	8073681	2011-12-06

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) [i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country [i]	Filing Date (YYYY-MM-DD)	Access Code [i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

PTO/AIA/14 (12-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	090611-0438199
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE	

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	090611-0438199
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE	

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

Organization Name	VoiceBox Technologies Corporation

Mailing Address Information:

Address 1	11980 NE 24th Street		
Address 2	Suite 100		
City	Bellevue	**State/Province**	WA
Country [i]	US	Postal Code	98005
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

PTO/AIA/14 (12-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	090611-0438199
	Application Number	
Title of Invention	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE	

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications

Signature	/Ngai B. Zhang/			Date (YYYY-MM-DD)	2015-04-20
First Name	Ngai	Last Name	Zhang	Registration Number	65473

Additional Signature may be generated within this form by selecting the Add button. Add

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ATTORNEY DOCKET NUMBER: **090611-0424826**

DECLARATION (37 C.F.R. 1.63) FOR UTILITY PATENT APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

Title of Invention: SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

As a below named inventor, I hereby declare that:

This declaration is directed to United States application number 13/987,645 filed on August 19, 2013.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the application, including the claims.

I am aware of the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR Section 1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

(1) Legal Name of Inventor: LARRY BALDWIN

Signature: _____ Date: 5-16-14

(2) Legal Name of Inventor: TOM FREEMAN

Signature: _____ Date: _____

(3) Legal Name of Inventor: MICHAEL TJALVE

Signature: _____ Date: _____

Amazon/VB Assets
Exhibit 1003
Page 1422

ATTORNEY DOCKET NUMBER: 090611-0424826

DECLARATION (37 C.F.R. 1.63) FOR UTILITY PATENT APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

Title of Invention: SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

As a below named inventor, I hereby declare that:

This declaration is directed to United States application number 13/987,645 filed on August 19, 2013.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I have reviewed and understand the contents of the application, including the claims.

I am aware of the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR Section 1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

(1) Legal Name of Inventor: LARRY BALDWIN

Signature:_____ Date:_____

(2) Legal Name of Inventor: TOM FREEMAN

Signature: [signature] Date: 5/22/2014

(3) Legal Name of Inventor: MICHAEL TJALVE

Signature:_____ Date:_____

Amazon/VB Assets
Exhibit 1003
Page 1423

ATTORNEY DOCKET NUMBER: **090611-0424826**

DECLARATION (37 C.F.R. 1.63) FOR UTILITY PATENT APPLICATION USING AN APPLICATION DATA SHEET (37 C.F.R. 1.76)

Title of Invention: SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

As a below named inventor, I hereby declare that:

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I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

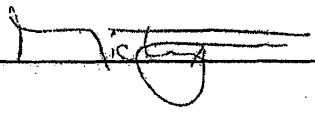
(1) Legal Name of Inventor: **LARRY BALDWIN**

Signature:_____ Date:_____

(2) Legal Name of Inventor: **TOM FREEMAN**

Signature:_____ Date:_____

(3) Legal Name of Inventor: **MICHAEL TJALVE**

Signature:  Date: 5/18/2014

Amazon/VB Assets
Exhibit 1003
Page 1424

(4) Legal Name of Inventor: **BLANE EBERSOLD**

Signature: _____ Date: 6/11/2014

(5) Legal Name of Inventor: **CHRIS WEIDER**

Signature: _____ Date: _____

(4) Legal Name of Inventor: **BLANE EBERSOLD**

Signature:_____ Date:_____

(5) Legal Name of Inventor: **CHRIS WEIDER**

Signature:_____ Date: 5/13/14

ASSIGNMENT

WHEREAS, **Larry Baldwin**, a citizen of the United States of America, residing at 25498 S.E. 274th Place, Maple Valley, Washington 98038; **Tom Freeman**, a citizen of the United States of America, residing at 6735 83rd Avenue, S.E., Mercer Island, Washington 98040; **Michael Tjalve**, a citizen of Denmark, residing at 14904 SE 47th Court, Bellevue, Washington 98006; **Blane Ebersold**, a citizen of the United States of America, residing at 4721 Admiral Way, S.E., Seattle, Washington 98116; and **Chris Weider**, a citizen of the United States of America, residing at 2618 Grand Avenue, #B-508, Everett, Washington 98201 (hereinafter "Assignors"), have made an invention entitled

"SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE"

described in an application for United States Letters Patent, which is found in U.S. Application No. 11/580,926 filed on October 16, 2006, and

WHEREAS, **VoiceBox Technologies, Inc.** (hereinafter "Assignee"), a **Washington** corporation having a place of business at **11980 NE 24th Street, Bellevue, Washington 98005**, is desirous of acquiring the entire right, title and interest in and to the aforesaid invention, application and all Letters Patent of the United States or any foreign country, including continuations, continuations-in-part, reissues, reexaminations, extensions, substitutes and divisions which may be granted therefor;

NOW THEREFORE, in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, the said Assignors, by these presents, do sell, assign and transfer unto Assignee, its successors, legal representatives and assigns, the full and exclusive right in and to the said invention as described in the said application, and in and to any Letters Patent of the United States or any foreign country, including continuations, continuations-in-part, reissues, reexaminations, extensions, substitutes and divisions which may be granted therefor and all rights to claim priority on the basis of said application; and we further grant to Assignee the sole right to sue and collect damages for past infringement;

AND ASSIGNORS HEREBY authorize and request the Commissioner of Patents and Trademarks or any other proper officer or agency of any country to issue all said Letters Patent to said Assignee;

AND ASSIGNORS HEREBY warrant and covenant that it has the full right to convey the entire interest herein assigned and that Assignors have not executed and will not execute any instrument or assignment in conflict herewith;

AND ASSIGNORS HEREBY agree to communicate to said Assignee or its representatives any facts known to it respecting said invention, to execute all divisional, continuation, reissue, reexamination, extension, substitute and foreign applications, sign all lawful documents and make all rightful oaths and declarations relating to said invention, execute and deliver any and all papers that may be necessary or desirable to perfect the title to this invention in said Assignee, its successors, legal representatives or assigns, and to testify in any judicial or administrative proceeding and generally do everything possible to aid the said Assignee to obtain and enforce said Letters Patent in the United States or any foreign country when requested so to do by said Assignee.

Signature of Inventor: Larry Baldwin
Inventor's Name: **Larry Baldwin**
Date of Execution: 12/29/2006

Signature of Inventor:
Inventor's Name: **Tom Freeman**
Date of Execution: 12/28/2006

Signature of Inventor:
Inventor's Name: **Michael Tjalve**
Date of Execution: 12/28/2006

Signature of Inventor:
Inventor's Name: **Blane Ebersold**

Date of Execution: 12/28/2006

Signature of Inventor:
Inventor's Name: **Chris Weider**

Date of Execution: 12/28/06

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

■ Practitioners associated with Customer Number: 00909

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

■ The address associated with Customer Number: 00909

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: VoiceBox Technologies Corporation
11980 NE 24th Street, Suite 100
Bellevue, Washington 98005

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Todd Kenck	Date	5/13/14
Name	Todd Kenck	Telephone	425.968.7907
Title	Chief Financial Officer of VoiceBox Technologies Corporation		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: VoiceBox Technologies Corporation

Application No./Patent No.: TBD Filed/Issue Date: April 20, 2015

Titled: SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

VoiceBox Technologies Corporation, a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at Reel_____, Frame____, or for which a COPY thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at Reel _____, Frame ____or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO

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PTO/AIA/96 (08-12)
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STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a COPY thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a COPY thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a COPY thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a COPY thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Ngai B. Zhang/	April 20, 2015
Signature	Date
Ngai B. Zhang	65,473
Printed or Typed Name	Title or Registration Number

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTORS :	Larry BALDWIN *et al.*	CONFIRMATION No.:	To be Determined
SERIAL NUMBER :	To be Determined	EXAMINER:	To be Determined
FILING DATE :	Herewith (April 20, 2015)	ART UNIT:	To be Determined
FOR :	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE		

INFORMATION DISCLOSURE STATEMENT (IDS)

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicant hereby makes of record in the above-identified application the documents listed on the attached Form PTO-1449.

Applicant has listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the date indicated.

Applicant reserves the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered.

This Information Disclosure Statement is being filed within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d), or within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application, or before the mailing date of a first Office Action on the merits, or before the mailing date of a first Office Action after the filing of a request for continued examination under 37 C.F.R. § 1.114. No certification or fee is required. 37 C.F.R. § 1.97(b).

The Foreign Patent Documents and the non-patent literature ("Other Documents") were cited by or submitted to the Office in Application No. 13/987,645, filed August 19, 2013, which is relied upon for an earlier filing date under 35 U.S.C. § 120. Thus copies of these documents are not attached. 37 C.F.R. § 1.98(d).

It is respectfully requested that the Examiner initial and return a copy of the enclosed PTO-1449.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

By /Ngai B. Zhang/
Ngai B. Zhang
Registration No.: 65,473

Customer No.
00909

P. O. Box 10500
McLean, Virginia 22102
Telephone: (703) 770-7900
Telefax: (703) 770-7901

Dated: April 20, 2015

INFORMATION DISCLOSURE CITATION IN AN APPLICATION	Docket Number	Application Number
	090611-0438199	*To be Determined*
	Applicant(s)	
	Larry BALDWIN *et al.*	
	Filing Date	Group Art Unit
Form PTO-1449	Herewith (April 20, 2015)	*To be Determined*

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	1A	4,430,669	02/07/1984	Cheung	358	122	
	1B	4,821,027	04/11/1989	Mallory *et al.*	340	521	
	1C	4,829,423	05/09/1989	Tennant *et al.*	364	200	
	1D	4,910,784	03/20/1990	Doddington *et al.*	381	43	
	1E	5,027,406	06/25/1991	Roberts *et al.*	381	43	
	1F	5,155,743	10/13/1992	Jacobs	375	28	
	1G	5,164,904	11/17/1992	Sumner	364	436	
	1H	5,208,748	05/04/1993	Flores *et al.*	364	419	
	1I	5,274,560	12/28/1993	LaRue	364	444	
	1J	5,357,596	10/18/1994	Takebayashi *et al.*	395	2.84	
	1K	5,377,350	12/27/1994	Skinner	395	600	
	1L	5,386,556	01/31/1995	Hedin et al.	395	600	
	1M	5,424,947	06/13/1995	Nagao et al.	364	419.08	
	1N	5,471,318	11/28/1995	Ahuja et al.	358	400	
	1O	5,475,733	12/12/1995	Eisdorfer et al.	379	52	
	1P	5,488,652	01/30/1996	Bielby *et al.*	379	88	
	1Q	5,499,289	03/12/1996	Bruno et al.	379	220	
	1R	5,500,920	03/19/1996	Kupiec	395	2.79	
	1S	5,517,560	05/14/1996	Greenspan	379	114	
	1T	5,533,108	07/02/1996	Harris et al.	379	201	
	1U	5,537,436	07/16/1996	Bottoms et al.	375	222	
	1V	5,539,744	07/23/1996	Chu et al.	370	60	
	1W	5,557,667	09/17/1996	Bruno et al.	379	201	

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translations YES	Translations NO
	1X	1 320 043 A2	06/18/2003	Europe				
	1Y	1 646 037	04/12/2006	Europe				
	1Z	WO 99/46763	09/16/1999	International				
	1AA	WO 00/21232	04/13/2000	International				
	1BB	WO 00/46792	08/10/2000	International				

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	1CC	REUTERS, "IBM to Enable Honda Drivers to Talk to Cars", Charles Schwab & Co., Inc., July 28, 2002, 1 page.
	1DD	LIN, Bor-shen, *et al.*, "A Distributed Architecture for Cooperative Spoken Dialogue Agents with Coherent Dialogue State and History", ASRU'99, 1999, 4 pages.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

INFORMATION DISCLOSURE CITATION IN AN APPLICATION	Docket Number	Application Number
	090611-0438199	*To be Determined*
	Applicant(s)	
	Larry BALDWIN *et al.*	
	Filing Date	Group Art Unit
Form PTO-1449	Herewith (April 20, 2015)	*To be Determined*

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	2A	5,559,864	09/24/1996	Kennedy, Jr.	379	59	
	2B	5,563,937	10/08/1996	Bruno et al.	379	201	
	2C	5,577,165	11/19/1996	Takebayashi et al.	395	2.84	
	2D	5,590,039	12/31/1996	Ikeda et al.	395	759	
	2E	5,608,635	03/04/1997	Tamai	364	449.3	
	2F	5,617,407	04/01/1997	Bareis	369	275.3	
	2G	5,633,922	05/27/1997	August et al.	379	220	
	2H	5,634,086	05/27/1997	Rtischev et al.	395	2.79	
	2I	5,652,570	07/29/1997	Lepkofker	340	573	
	2J	5,675,629	10/07/1997	Raffel et al.	379	58	
	2K	5,696,965	12/09/1997	Dedrick	395	610	
	2L	5,708,422	01/13/1998	Blonder et al.	340	825.34	
	2M	5,721,938	02/24/1998	Stuckey	395	754	
	2N	5,722,084	02/24/1998	Chakrin et al.	455	551	
	2O	5,740,256	04/14/1998	Castello Da Costa et al.	361	94.7	
	2P	5,742,763	04/21/1998	Jones	395	200.3	
	2Q	5,748,841	05/05/1998	Morin et al.	395	2.66	
	2R	5,748,974	05/05/1998	Johnson	395	759	
	2S	5,752,052	05/12/1998	Richardson et al.	395	759	
	2T	5,754,784	05/19/1998	Garland et al.	395	200.49	
	2U	5,761,631	06/02/1998	Nasukawa	704	9	
	2V	5,774,841	06/30/1998	Salazar et al.	704	225	
	2W	5,774,859	06/30/1998	Houser et al.	704	275	

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translations YES	Translations NO
	2X	WO 01/78065	10/18/2001	International				
	2Y	WO 2004/072954	08/26/2004	International				
	2Z	WO 2007/019318	02/15/2007	International				
	2AA	WO 2007/021587	02/22/2007	International				
	2BB	WO 2007/027546	03/08/2007	International				

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	2CC	KUHN, Thomas, *et al.*, "Hybrid In-Car Speech Recognition for Mobile Multimedia Applications", Vehicular Technology Conference, IEEE, July 1999, pages 2009-2013.
	2DD	BELVIN, Robert, *et al.*, "Development of the HRL Route Navigation Dialogue System", Proceedings of the First International Conference on Human Language Technology Research, San Diego, 2001, pages 1-5.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

INFORMATION DISCLOSURE CITATION IN AN APPLICATION	Docket Number	Application Number
	090611-0438199	*To be Determined*
	Applicant(s)	
	Larry BALDWIN *et al.*	
	Filing Date	Group Art Unit
Form PTO-1449	Herewith (April 20, 2015)	*To be Determined*

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	3A	5,794,050	08/11/1998	Dahlgren et al.	395	708	
	3B	5,794,196	08/11/1998	Yegnanarayanan et al.	704	255	
	3C	5,797,112	08/18/1998	Komatsu et al.	701	201	
	3D	5,799,276	08/25/1998	Komissarchik et al.	704	251	
	3E	5,802,510	09/01/1998	Jones	707	2	
	3F	5,832,221	11/03/1998	Jones	375	200.36	
	3G	5,839,107	11/17/1998	Gupta et al.	704	270	
	3H	5,848,396	12/08/1998	Gerace	705	10	
	3I	5,855,000	12/29/1998	Waibel et al.	704	235	
	3J	5,867,817	02/02/1999	Catallo et al.	704	255	
	3K	5,878,385	03/02/1999	Bralich et al.	704	9	
	3L	5,878,386	03/02/1999	Coughlin	704	10	
	3M	5,892,813	04/06/1999	Morin et al.	379	88.01	
	3N	5,892,900	04/06/1999	Ginter et al.	395	186	
	3O	5,895,464	04/20/1999	Bhandari et al.	707	3	
	3P	5,895,466	04/20/1999	Goldberg et al.	707	5	
	3Q	5,897,613	04/27/1999	Chan	704	210	
	3R	5,902,347	05/11/1999	Backman et al.	701	200	
	3S	5,911,120	06/08/1999	Jarett et al.	455	417	
	3T	5,918,222	06/29/1999	Fukui et al.	707	1	
	3U	5,926,784	07/20/1999	Richardson et al.	704	9	
	3V	5,933,822	08/03/1999	Braden-Harder et al.	707	5	
	3W	5,950,167	09/07/1999	Yaker	704	275	

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translations YES	Translations NO
	3X	WO 2007/027989	03/08/2007	International				
	3Y	WO 2008/098039	08/14/2008	International				
	3Z	WO 2008/118195	10/02/2008	International				
	3AA	WO 2009/075912	06/18/2009	International				
	3BB	WO 2009/145796	12/03/2009	International				

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	3CC	LIND, R., *et al.*, "The Network Vehicle—A Glimpse into the Future of Mobile Multi-Media", IEEE Aerosp. Electron. Systems Magazine, Volume 14, No. 9, September 1999, pages 27-32.
	3DD	ZHAO, Yilin, "Telematics: Safe and Fun Driving", IEEE Intelligent Systems, Volume 17, Issue 1, 2002, pages 10-14.

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP Section 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

INFORMATION DISCLOSURE CITATION IN AN APPLICATION	Docket Number	Application Number
	090611-0438199	*To be Determined*
	Applicant(s)	
	Larry BALDWIN *et al.*	
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Form PTO-1449	Herewith (April 20, 2015)	*To be Determined*

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	4A	5,953,393	09/14/1999	Culbreth et al.	379	88.25	
	4B	5,960,397	09/28/1999	Rahim	704	244	
	4C	5,960,399	09/28/1999	Barclay et al.	704	270	
	4D	5,960,447	09/28/1999	Holt et al.	707	500	
	4E	5,963,894	10/05/1999	Richardson et al.	704	9	
	4F	5,963,940	10/05/1999	Liddy et al.	707	5	
	4G	5,987,404	11/16/1999	Della Pietra et al.	704	9	
	4H	5,991,721	11/23/1999	Asano et al.	704	257	
	4I	5,995,119	11/30/1999	Cosatto et al.	345	473	
	4J	5,995,928	11/30/1999	Nguyen et al.	704	251	
	4K	6,009,382	12/28/1999	Martino et al.	704	1	
	4L	6,014,559	01/11/2000	Amin	455	413	
	4M	6,018,708	01/25/2000	Dahan et al.	704	244	
	4N	6,021,384	02/01/2000	Gorin et al.	704	1	
	4O	6,028,514	02/22/2000	Lemelson et al.	340	539	
	4P	6,035,267	03/07/2000	Watanabe et al.	704	1	
	4Q	6,044,347	03/28/2000	Abella et al.	704	272	
	4R	6,049,602	04/11/2000	Foladare et al.	379	265	
	4S	6,049,607	04/11/2000	Marash et al.	379	410	
	4T	6,058,187	05/02/2000	Chen	380	21	
	4U	6,067,513	05/23/2000	Ishimitsu	704	233	
	4V	6,076,059	06/13/2000	Glickman et al.	704	260	
	4W	6,078,886	06/20/2000	Dragosh et al.	704	270	

FOREIGN PATENT DOCUMENTS

	REF	DOCUMENT NO.	DATE	COUNTRY	CLASS	SUBCLASS	Translations YES	Translations NO
	4X	WO 2010/096752	08/26/2010	International				
	4Y	2006-146881	06/08/2006	Japan				
	4Z	2008-027454	02/07/2008	Japan				

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	4AA	CHAI *et al.*, "MIND: A Semantics-Based Multimodal Interpretation Framework for Conversational System", Proceedings of the International CLASS Workshop on Natural, Intelligent and Effective Interaction in Multimodal Dialogue Systems, June 2002, pages 37-46.
	4BB	CHEYER *et al.*, "Multimodal Maps: An Agent-Based Approach", International Conference on Cooperative Multimodal Communication (CMC/95), May 24-26, 1995, pages 111-121.
	4CC	ELIO *et al.*, "On Abstract Task Models and Conversation Policies" in Workshop on Specifying and Implementing Conversation Policies, Autonomous Agents '99, Seattle, 1999, 10 pages.

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	5A	6,081,774	06/27/2000	De Hita et al.	704	9	
	5B	6,085,186	07/04/2000	Christianson et al.	707	3	
	5C	6,101,241	08/08/2000	Boyce et al.	379	88.01	
	5D	6,108,631	08/22/2000	Ruhl	704	270	
	5E	6,119,087	09/12/2000	Kuhn et al.	704	270	
	5F	6,122,613	09/19/2000	Baker	704	235	
	5G	6,134,235	10/17/2000	Goldman et al.	370	352	
	5H	6,144,667	11/07/2000	Doshi et al.	370	401	
	5I	6,144,938	11/07/2000	Surace et al.	704	257	
	5J	6,154,526	11/28/2000	Dahlke et al.	379	88.03	
	5K	6,160,883	12/12/2000	Jackson et al.	379	230	
	5L	6,167,377	12/26/2000	Gillick et al.	704	240	
	5M	6,173,266	01/09/2001	Marx et al.	704	270	
	5N	6,173,279	01/09/2001	Levin et al.	707	5	
	5O	6,175,858	01/16/2001	Bulfer et al.	709	206	
	5P	6,185,535	02/06/2001	Hedin et al.	704	270	
	5Q	6,188,982	02/13/2001	Chiang	704	256	
	5R	6,192,110	02/20/2001	Abella et al.	379	88.01	
	5S	6,192,338	02/20/2001	Haszto et al.	704	257	
	5T	6,195,634	02/27/2001	Dudemaine et al.	704	231	
	5U	6,195,651	02/27/2001	Handel et al.	707	2	
	5V	6,199,043	03/06/2001	Happ	704	272	
	5W	6,208,964	03/27/2001	Sabourin	704	244	

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	5X	2008-139928	06/19/2008	Japan				

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	5Y	TURUNEN, "Adaptive Interaction Methods in Speech User Interfaces", Conference on Human Factors in Computing Systems, Seattle, Washington, 2001, pages 91-92.
	5Z	MAO, Mark Z., "Automatic Training Set Segmentation for Multi-Pass Speech Recognition", Department of Electrical Engineering, Stanford University, CA, copyright 2005, IEEE, pages I-685 to I-688.
	5AA	VANHOUCKE, Vincent, "Confidence Scoring and Rejection Using Multi-Pass Speech Recognition", Nuance Communications, Menlo Park, CA, 2005, 4 pages.

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	6A	6,208,972	03/27/2001	Grant et al.	704	275	
	6B	6,219,346	04/17/2001	Maxemchuk	370	338	
	6C	6,219,643	04/17/2001	Cohen et al.	704	257	
	6D	6,226,612	05/01/2001	Srenger et al.	704	256	
	6E	6,233,556	05/15/2001	Teunen et al.	704	250	
	6F	6,233,559	05/15/2001	Balakrishnan	704	275	
	6G	6,233,561	05/15/2001	Junqua et al.	704	277	
	6H	6,236,968	05/22/2001	Kanevsky et al.	704	275	
	6I	6,246,981	06/12/2001	Papineni et al.	704	235	
	6J	6,246,990	06/12/2001	Happ	704	275	
	6K	6,266,636	07/24/2001	Kosaka et al.	704	244	
	6L	6,269,336	07/31/2001	Ladd et al.	704	270	
	6M	6,272,455	08/07/2001	Hoshen et al.	704	1	
	6N	6,275,231	08/14/2001	Obradovich	345	349	
	6O	6,278,377	08/21/2001	DeLine et al.	340	815.4	
	6P	6,278,968	08/21/2001	Franz et al.	704	3	
	6Q	6,288,319	09/11/2001	Catona	84	609	
	6R	6,292,767	09/18/2001	Jackson et al.	704	1	
	6S	6,301,560	10/09/2001	Masters	704	251	
	6T	6,308,151	10/23/2001	Smith	704	235	
	6U	6,311,159	10/30/2001	Van Tichelen et al.	704	275	
	6V	6,314,402	11/06/2001	Monaco et al.	704	275	
	6W	6,321,196	11/20/2001	Franceschi	704	243	

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	6X	WENG, Fuliang, *et al.*, "Efficient Lattice Representation and Generation", Speech Technology and Research Laboratory, SRI International, Menlo Park, CA, 1998, 4 pages.
	6Y	EL MELIANI *et al.*, "A Syllabic-Filler-Based Continuous Speech Recognizer for Unlimited Vocabulary", Canadian Conference on Electrical and Computer Engineering, Volume 2, September 5-8, 1995, pages 1007-1010.

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	7A	6,356,869	03/12/2002	Chapados et al.	704	275	
	7B	6,362,748	03/26/2002	Huang	340	901	
	7C	6,366,882	04/02/2002	Bijl et al.	704	235	
	7D	6,366,886	04/02/2002	Dragosh et al.	704	270.1	
	7E	6,374,214	04/16/2002	Friedland et al.	704	235	
	7F	6,377,913	04/23/2002	Coffman et al.	704	8	
	7G	6,381,535	04/30/2002	Durocher et al.	701	202	
	7H	6,385,596	05/07/2002	Wiser et al.	705	51	
	7I	6,385,646	05/07/2002	Brown et al.	709	217	
	7J	6,393,403	05/21/2002	Majaniemi	704	275	
	7K	6,393,428	05/21/2002	Miller et al.	707	102	
	7L	6,397,181	05/28/2002	Li et al.	704	256	
	7M	6,404,878	06/11/2002	Jackson et al.	379	221.01	
	7N	6,405,170	06/11/2002	Phillips et al.	704	270	
	7O	6,408,272	06/18/2002	White et al.	704	270.1	
	7P	6,411,810	06/25/2002	Maxemchuk	455	453	
	7Q	6,411,893	06/25/2002	Ruhl	701	207	
	7R	6,415,257	07/02/2002	Junqua et al.	704	275	
	7S	6,418,210	07/09/2002	Sayko	379	142.15	
	7T	6,420,975	07/16/2002	DeLine et al.	340	815.4	
	7U	6,429,813	08/06/2002	Feigen	342	357.13	
	7V	6,430,285	08/06/2002	Bauer et al.	379	265.01	
	7W	6,430,531	08/06/2002	Polish	704	257	

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	7X	ARRINGTON, Michael, "Google Redefines GPS Navigation Landscape: Google Maps Navigation for Android 2.0", TechCrunch, printed from the Internet <http://www.techcrunch.com/2009/10/28/google-redefines-car-gps-navigation-google-maps-navigation-android/>, October 28, 2009, 4 pages.
	7Y	BAZZI, Issam *et al.*, "Heterogeneous Lexical Units for Automatic Speech Recognition: Preliminary Investigations", Processing of the IEEE International Conference on Acoustics, Speech, and Signal Processing, Volume 3, June 5-9, 2000, XP010507574, pages 1257-1260.

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	8A	6,434,523	08/13/2002	Monaco	704	257	
	8B	6,434,524	08/13/2002	Weber	704	257	
	8C	6,434,529	08/13/2002	Walker et al.	704	275	
	8D	6,442,522	08/27/2002	Carberry et al.	704	257	
	8E	6,446,114	09/03/2002	Bulfer et al.	709	206	
	8F	6,453,153	09/17/2002	Bowker et al.	455	67.4	
	8G	6,453,292	09/17/2002	Ramaswamy et al.	704	235	
	8H	6,456,711	09/24/2002	Cheung et al.	379	265.09	
	8I	6,456,974	09/24/2002	Baker et al.	704	270.1	
	8J	6,466,654	10/15/2002	Cooper et al.	379	88.01	
	8K	6,466,899	10/15/2002	Yano et al.	704	1	
	8L	6,470,315	10/22/2002	Netsch et al.	704	256	
	8M	6,487,494	11/26/2002	Odinak et al.	701	202	
	8N	6,487,495	11/26/2005	Gale et al.	701	209	
	8O	6,498,797	12/24/2002	Anerousis et al.	370	522	
	8P	6,499,013	12/24/2002	Weber	704	257	
	8Q	6,501,833	12/31/2002	Phillips et al.	379	88.07	
	8R	6,501,834	12/31/2002	Milewski et al.	379	93.24	
	8S	6,505,155	01/07/2003	Vanbuskirk et al.	704	246	
	8T	6,510,417	01/21/2003	Woods et al.	704	275	
	8U	6,513,006	01/28/2003	Howard et al.	704	257	
	8V	6,522,746	02/18/2003	Marchok et al.	379	406.03	
	8W	6,523,061	02/18/2003	Halverson et al.	709	202	

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	8X	O'SHAUGHNESSY, Douglas, "Interacting with Computers by Voice: Automatic Speech Recognition and Synthesis", Proceedings of the IEEE, Volume 91, No. 9, September 1, 2003, XP011100665, pages 1272-1305.
	8Y	"Statement in Accordance with the Notice from the European Patent Office dated 1 October 2007 Concerning Business Methods (OJ EPO 11/2007, 592-593), XP002456252

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	9A	6,532,444	03/11/2003	Weber	704	257	
	9B	6,539,348	03/25/2003	Bond et al.	704	9	
	9C	6,549,629	04/15/2003	Finn et al.	381	92	
	9D	6,553,372	04/22/2003	Brassell et al.	707	5	
	9E	6,556,970	04/29/2003	Sasaki et al.	704	257	
	9F	6,556,973	04/29/2003	Lewin	704	277	
	9G	6,560,576	05/06/2003	Cohen et al.	704	270	
	9H	6,560,590	05/06/2003	Shwe et al.	706	55	
	9I	6,567,778	05/20/2003	Chao Chang et al.	704	257	
	9J	6,567,797	05/20/2003	Schuetze et al.	707	2	
	9K	6,570,555	05/27/2003	Prevost et al.	345	156	
	9L	6,570,964	05/27/2003	Murveit et al.	379	67.1	
	9M	6,571,279	05/27/2003	Herz et al.	709	217	
	9N	6,574,597	06/03/2003	Mohri et al.	704	251	
	9O	6,574,624	06/03/2003	Johnson et al.	707	5	
	9P	6,578,022	06/10/2003	Foulger et al.	706	45	
	9Q	6,581,103	06/17/2003	Dengler	709	231	
	9R	6,584,439	06/24/2003	Geilhufe et al.	704	270	
	9S	6,587,858	07/01/2003	Strazza	707	102	
	9T	6,591,239	07/08/2003	McCall et al.	704	275	
	9U	6,594,257	07/15/2003	Doshi et al.	370	352	
	9V	6,594,367	07/15/2003	Marash et al.	381	92	
	9W	6,598,018	07/22/2003	Junqua	704	251	

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	10B	6,604,075	08/05/2003	Brown et al.	704	270.1	
	10C	6,604,077	08/05/2003	Dragosh et al.	704	270.1	
	10D	6,606,598	08/12/2003	Holthouse et al.	704	275	
	10E	6,611,692	08/26/2003	Raffel et al.	455	552	
	10F	6,614,773	09/02/2003	Maxemchuk	370	337	
	10G	6,615,172	09/02/2003	Bennett et al.	704	257	
	10H	6,622,119	09/16/2003	Ramaswamy et al.	704	9	
	10I	6,629,066	09/30/2003	Jackson et al.	704	9	
	10J	6,631,346	10/07/2003	Karaorman et al.	704	9	
	10K	6,631,351	10/07/2003	Ramachandran et al.	704	270	
	10L	6,633,846	10/14/2003	Bennett et al.	704	257	
	10M	6,636,790	10/21/2003	Lightner et al.	701	33	
	10N	6,643,620	11/04/2003	Contolini et al.	704	270	
	10O	6,647,363	11/11/2003	Claassen	704	1	
	10P	6,650,747	11/18/2003	Bala et al.	379	265.06	
	10Q	6,658,388	12/02/2003	Kleindienst et al.	704	275	
	10R	6,678,680	01/13/2004	Woo	707	6	
	10S	6,681,206	01/20/2004	Gorin et al.	704	243	
	10T	6,691,151	02/10/2004	Cheyer et al.	709	202	
	10U	6,701,294	03/02/2004	Ball et al.	704	257	
	10V	6,704,396	03/09/2004	Parolkar et al.	379	88.17	
	10W	6,704,576	03/09/2004	Brachman et al.	455	503	

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	11A	6,704,708	03/09/2004	Pickering	704	235	
	11B	6,707,421	03/16/2004	Drury et al.	342	357.1	
	11C	6,708,150	03/16/2004	Hirayama et al.	704	243	
	11D	6,721,001	04/13/2004	Berstis	348	231.3	
	11E	6,721,633	04/13/2004	Funk et al.	701	1	
	11F	6,721,706	04/13/2004	Strubbe et al.	704	275	
	11G	6,726,636	04/27/2004	Der Ghazarian et al.	600	532	
	11H	6,735,592	05/11/2004	Neumann et al.	707	101	
	11I	6,739,556	05/25/2004	Langston	244	189	
	11J	6,741,931	05/25/2004	Kohut et al.	701	209	
	11K	6,742,021	05/25/2004	Halverson et al.	709	218	
	11L	6,745,161	06/01/2004	Arnold et al.	704	7	
	11M	6,751,591	06/15/2004	Gorin et al.	704	257	
	11N	6,751,612	06/15/2004	Schuetze et al.	707	4	
	11O	6,754,485	06/22/2004	Obradovich et al.	455	414.1	
	11P	6,754,627	06/22/2004	Woodward	704	235	
	11Q	6,757,544	06/29/2004	Rangarajan et al.	455	456.1	
	11R	6,757,718	06/29/2004	Halverson et al.	709	218	
	11S	6,795,808	09/21/2004	Strubbe et al.	704	275	
	11T	6,801,604	10/05/2004	Maes et al.	379	88.17	
	11U	6,801,893	10/05/2004	Backfried et al.	704	257	
	11V	6,813,341	11/02/2004	Mahoney	379	88.01	
	11W	6,829,603	12/07/2004	Chai et al.	707	5	

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	12A	6,832,230	12/14/2004	Zilliacus et al.	707	203	
	12B	6,833,848	12/21/2004	Wolff et al.	345	719	
	12C	6,850,603	02/01/2005	Eberle et al.	379	88.16	
	12D	6,856,990	02/15/2005	Barile et al.	707	10	
	12E	6,865,481	03/08/2005	Kawazoe et al.	701	211	
	12F	6,868,380	03/15/2005	Kroeker	704	240	
	12G	6,868,385	03/15/2005	Gerson	704	275	
	12H	6,873,837	03/29/2005	Yoshioka et al.	455	321	
	12I	6,877,001	04/05/2005	Wolf et al.	707	3	
	12J	6,877,134	04/05/2005	Fuller et al.	715	500.1	
	12K	6,901,366	05/31/2005	Kuhn et al.	704	275	
	12L	6,910,003	06/21/2005	Arnold et al.	704	4	
	12M	6,912,498	06/28/2005	Stevens et al.	704	235	
	12N	6,915,126	07/05/2005	Mazzara, Jr.	455	411	
	12O	6,928,614	08/09/2005	Everhart	715	728	
	12P	6,934,756	08/23/2005	Maes	709	227	
	12Q	6,937,977	08/30/2005	Gerson	704	201	
	12R	6,937,982	08/30/2005	Kitaoka et al.	704	252	
	12S	6,941,266	09/06/2005	Gorin et al.	704	257	
	12T	6,944,594	09/13/2005	Busayapongchai et al.	704	275	
	12U	6,950,821	09/27/2005	Faybishenko et al.	707	10	
	12V	6,954,755	10/11/2005	Reisman	707	10	
	12W	6,959,276	10/25/2005	Droppo et al.	704	226	

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*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	13A	6,961,700	11/01/2005	Mitchell et al.	704	235	
	13B	6,963,759	11/08/2005	Gerson	455	563	
	13C	6,964,023	11/08/2005	Maes et al.	715	811	
	13D	6,968,311	11/22/2005	Knockeart et al.	704	270	
	13E	6,973,387	12/06/2005	Masclet et al.	701	211	
	13F	6,975,993	12/13/2005	Keiller	704	275	
	13G	6,980,092	12/27/2005	Turnbull et al.	340	425.5	
	13H	6,983,055	01/03/2006	Luo	381	313	
	13I	6,990,513	01/24/2006	Belfiore et al.	709	203	
	13J	6,996,531	02/07/2006	Korall et al.	704	270	
	13K	7,003,463	02/21/2006	Maes et al.	704	270.1	
	13L	7,016,849	03/21/2006	Arnold et al.	704	275	
	13M	7,020,609	03/28/2006	Thrift et al.	704	270.1	
	13N	7,024,364	04/04/2006	Guerra et al.	704	270	
	13O	7,027,586	04/11/2006	Bushey et al.	379	265.09	
	13P	7,027,975	04/11/2006	Pazandak et al.	704	9	
	13Q	7,035,415	04/25/2006	Belt et al.	381	92	
	13R	7,036,128	04/25/2006	Julia et al.	719	317	
	13S	7,043,425	05/09/2006	Pao	704	211	
	13T	7,054,817	05/30/2006	Shao	704	270	
	13U	7,058,890	06/06/2006	George et al.	715	728	
	13V	7,062,488	06/13/2006	Reisman	707	8	
	13W	7,069,220	06/27/2006	Coffman et al.	704	275	

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*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	14A	7,072,834	07/04/2006	Zhou	704	244	
	14B	7,076,362	07/11/2006	Ohtsuji et al.	701	211	
	14C	7,082,469	07/25/2006	Gold et al.	709	231	
	14D	7,085,708	08/01/2006	Manson	704	9	
	14E	7,092,928	08/15/2006	Elad et al.	706	60	
	14F	7,107,210	09/12/2006	Deng et al.	704	226	
	14G	7,107,218	09/12/2006	Preston	704	270	
	14H	7,110,951	09/19/2006	Lemelson et al.	704	270	
	14I	7,127,395	10/24/2006	Gorin et al.	704	257	
	14J	7,127,400	10/24/2006	Koch	704	270.1	
	14K	7,130,390	10/31/2006	Abburi	379	88.17	
	14L	7,136,875	11/14/2006	Anderson et al.	707	104.1	
	14M	7,137,126	11/14/2006	Coffman et al.	719	328	
	14N	7,143,037	11/28/2006	Chestnut	704	251	
	14O	7,143,039	11/28/2006	Stifelman et al.	704	270	
	14P	7,146,319	12/05/2006	Hunt	704	254	
	14Q	7,149,696	12/12/2006	Shimizu et al.	705	1	
	14R	7,165,028	01/16/2007	Gong	704	233	
	14S	7,170,993	01/30/2007	Anderson et al.	379	265.09	
	14T	7,171,291	01/30/2007	Obradovich	701	29	
	14U	7,174,300	02/06/2007	Bush	704	275	
	14V	7,177,798	02/13/2007	Hsu et al.	704	9	
	14W	7,184,957	02/27/2007	Brookes et al.	704	246	

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*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	15A	7,190,770	03/13/2007	Ando et al.	379	88.01	
	15B	7,197,069	03/27/2007	Agazzi et al.	375	233	
	15C	7,197,460	03/27/2007	Gupta et al.	704	270.1	
	15D	7,203,644	04/10/2007	Anderson et al.	704	246	
	15E	7,206,418	04/17/2007	Yang et al.	381	92	
	15F	7,207,011	04/17/2007	Mulvey et al.	715	812	
	15G	7,215,941	05/08/2007	Beckmann et al.	455	404.1	
	15H	7,228,276	06/05/2007	Omote et al.	704	243	
	15I	7,231,343	06/12/2007	Treadgold et al.	704	9	
	15J	7,236,923	06/26/2007	Gupta	704	9	
	15K	7,254,482	08/07/2007	Kawasaki et al.	701	211	
	15L	7,272,212	09/18/2007	Eberle et al.	379	88.17	
	15M	7,277,854	10/02/2007	Bennett et al.	704	257	
	15N	7,283,829	10/16/2007	Christenson et al.	455	461	
	15O	7,283,951	10/16/2007	Marchisio et al.	704	9	
	15P	7,289,606	10/30/2007	Sibal et al.	379	52	
	15Q	7,299,186	11/20/2007	Kuzunuki et al.	704	270.1	
	15R	7,301,093	11/27/2007	Sater et al.	84	615	
	15S	7,305,381	12/04/2007	Poppink et al.	1	1	
	15T	7,321,850	01/22/2008	Wakita	704	10	
	15U	7,328,155	02/05/2008	Endo et al.	704	251	
	15V	7,337,116	02/26/2008	Charlesworth et al.	704	254	
	15W	7,340,040	03/04/2008	Saylor et al.	379	67.1	

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	16A	7,366,285	04/29/2008	Parolkar et al.	379	88.17	
	16B	7,366,669	04/29/2008	Nishitani et al.	704	256	
	16C	7,376,645	05/20/2008	Bernard	707	3	
	16D	7,386,443	06/10/2008	Parthasarathy et al.	704	201	
	16E	7,398,209	07/08/2008	Kennewick et al.	704	255	
	16F	7,406,421	07/29/2008	Odinak et al.	704	275	
	16G	7,415,414	08/19/2008	Azara et al.	704	270	
	16H	7,421,393	09/02/2008	Di Fabbrizio et al.	704	275	
	16I	7,424,431	09/09/2008	Greene et al.	704	270	
	16J	7,447,635	11/04/2008	Konopka et al.	704	275	
	16K	7,451,088	11/11/2008	Ehlen et al.	704	270.1	
	16L	7,454,608	11/18/2008	Gopalakrishnan et al.	713	100	
	16M	7,461,059	12/02/2008	Richardson et al.	707	5	
	16N	7,472,020	12/30/2008	Brulle-Drews	701	211	
	16O	7,472,060	12/30/2008	Gorin et al.	704	240	
	16P	7,472,075	12/30/2008	Odinak et al.	705	26	
	16Q	7,477,909	01/13/2009	Roth	455	466	
	16R	7,478,036	01/13/2009	Shen et al.	704	9	
	16S	7,487,088	02/03/2009	Gorin et al.	704	240	
	16T	7,487,110	02/03/2009	Bennett et al.	705	26	
	16U	7,493,259	02/17/2009	Jones et al.	704	257	
	16V	7,493,559	02/17/2009	Wolff et al.	715	727	
	16W	7,502,672	03/10/2009	Kolls	701	29	

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	17A	7,502,738	03/10/2009	Kennewick et al.	704	257	
	17B	7,516,076	04/07/2009	Walker et al.	704	275	
	17C	7,529,675	05/05/2009	Maes	704	270.1	
	17D	7,536,297	05/19/2009	Byrd et al.	704	10	
	17E	7,536,374	05/19/2009	Au	706	55	
	17F	7,542,894	06/02/2009	Murata	704	9	
	17G	7,546,382	06/09/2009	Healey et al.	709	246	
	17H	7,548,491	06/16/2009	Macfarlane	367	198	
	17I	7,552,054	06/23/2009	Stifelman et al.	704	270	
	17J	7,558,730	07/07/2009	Davis et al.	704	235	
	17K	7,574,362	08/11/2009	Walker et al.	704	275	
	17L	7,577,244	08/18/2009	Taschereau	379	218.01	
	17M	7,606,708	10/20/2009	Hwang	704	257	
	17N	7,620,549	11/17/2009	Di Cristo et al.	704	257	
	17O	7,634,409	12/15/2009	Kennewick et al.	704	257	
	17P	7,640,006	12/29/2009	Portman et al.	455	412.1	
	17Q	7,640,160	12/29/2009	Di Cristo et al.	704	257	
	17R	7,640,272	12/29/2009	Mahajan et al.	707	104.1	
	17S	7,676,365	03/09/2010	Hwang et al.	704	240	
	17T	7,676,369	03/09/2010	Fujimoto et al.	704	270	
	17U	7,684,977	03/23/2010	Morikawa	704	211	
	17V	7,693,720	04/06/2010	Kennewick et al.	704	275	
	17W	7,729,916	06/01/2010	Coffman et al.	704	270	

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	18A	7,729,918	06/01/2010	Walker et al.	704	275	
	18B	7,729,920	06/01/2010	Chaar et al.	704	275	
	18C	7,734,287	06/08/2010	Ying	455	423	
	18D	7,748,021	06/29/2010	Obradovich	725	105	
	18E	7,788,084	08/31/2010	Brun et al.	704	7	
	18F	7,801,731	09/21/2010	Odinak et al.	704	275	
	18G	7,809,570	10/05/2010	Kennewick et al.	704	257	
	18H	7,818,176	10/19/2010	Freeman et al.	704	270	
	18I	7,831,426	11/09/2010	Bennett	704	252	
	18J	7,831,433	11/09/2010	Belvin et al.	704	275	
	18K	7,856,358	12/21/2010	Ho	704	270	
	18L	7,873,519	01/18/2011	Bennett	704	257	
	18M	7,873,523	01/18/2011	Potter et al.	704	275	
	18N	7,873,654	01/18/2011	Bernard	707	769	
	18O	7,881,936	02/01/2011	Longe et al.	704	257	
	18P	7,890,324	02/15/2011	Bangalore et al.	704	231	
	18Q	7,894,849	02/22/2011	Kass et al.	455	550.1	
	18R	7,902,969	03/08/2011	Obradovich	340	439	
	18S	7,917,367	03/29/2011	Di Cristo et al.	704	270.1	
	18T	7,920,682	04/05/2011	Byrne et al.	379	88.18	
	18U	7,949,529	05/24/2011	Weider et al.	704	270	
	18V	7,949,537	05/24/2011	Walker et al.	704	275	
	18W	7,953,732	05/31/2011	Frank et al.	707	724	

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	19A	7,974,875	07/05/2011	Quilici et al.	705	14.4	
	19B	7,983,917	07/19/2011	Kennewick et al.	704	257	
	19C	7,984,287	07/19/2011	Gopalakrishnan et al.	713	100	
	19D	8,005,683	08/23/2011	Tessel et al.	704	275	
	19E	8,015,006	09/06/2011	Kennewick et al.	704	236	
	19F	8,060,367	11/15/2011	Keaveney	704	247	
	19G	8,069,046	11/29/2011	Kennewick et al.	704	257	
	19H	8,073,681	12/06/2011	Baldwin et al.	704	9	
	19I	8,077,975	12/13/2011	Ma et al.	382	187	
	19J	8,082,153	12/20/2011	Coffman et al.	704	270	
	19K	8,086,463	12/27/2011	Ativanichayaphong et al.	704	275	
	19L	8,112,275	02/07/2012	Kennewick et al.	704	240	
	19M	8,140,327	03/20/2012	Kennewick et al.	704	226	
	19N	8,140,335	03/20/2012	Kennewick et al.	704	257	
	19O	8,145,489	03/27/2012	Freeman et al.	704	257	
	19P	8,150,694	04/03/2012	Kennewick et al.	704	257	
	19Q	8,155,962	04/10/2012	Kennewick et al.	704	257	
	19R	8,170,867	05/01/2012	Germain	704	9	
	19S	8,195,468	06/05/2012	Weider et al.	704	275	
	19T	8.200.485	06/12/2012	Lee et al.	704	231	
	19U	8,219,399	07/10/2012	Lutz et al.	704	270	
	19V	8,219,599	07/10/2012	Tunstall-Pedoe	707	955	
	19W	8,224,652	07/17/2012	Wang et al.	704	275	

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	20A	8,255,224	08/28/2012	Singleton et al.	704	275	
	20B	8,326,627	12/04/2012	Kennewick et al.	704	257	
	20C	8,326,634	12/04/2012	Di Cristo et al.	704	270.1	
	20D	8,326,637	12/04/2012	Baldwin et al.	704	275	
	20E	8,332,224	12/11/2012	Di Cristo et al.	704	257	
	20F	8,370,147	02/05/2013	Kennewick et al.	704	257	
	20G	8,447,607	05/21/2013	Weider et al.	704	250	
	20H	8,452,598	05/28/2013	Kennewick et al.	704	257	
	20I	8,509,403	08/13/2013	Chiu et al.	379	114.13	
	20J	8,515,765	08/20/2013	Baldwin et al.	704	275	
	20K	8,527,274	09/03/2013	Freeman et al.	704	257	
	20L	8,589,161	11/19/2013	Kennewick et al.	704	252	
	20M	8,620,659	12/31/2013	Di Cristo et al.	704	257	
	20N	8,719,009	05/06/2014	Baldwin et al.	704	9	
	20O	8,719,026	05/06/2014	Kennewick et al.	704	257	
	20P	8,731,929	05/20/2014	Kennewick et al.	704	257	
	20Q	8,738,380	05/27/2014	Baldwin et al.	704	257	
	20R	8,849,652	09/30/2014	Weider et al.	704	9	
	20S	8,849,670	09/30/2014	Di Cristo et al.	704	270.1	
	20T	8,886,536	11/11/2014	Freeman et al.	704	257	
	20U	8,983,839	03/17/2015	Kennewick et al.	704	254	
	20V	2001/0039492	11/08/2001	Nemoto	704	231	
	20W	2001/0041980	11/15/2001	Howard et al.	704	270	

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	21A	2001/0049601	12/06/2001	Kroeker et al.	704	254	
	21B	2001/0054087	12/20/2001	Flom et al.	709	218	
	21C	2002/0015500	02/07/2002	Belt et al.	381	66	
	21D	2002/0022927	02/21/2002	Lemelson et al.	701	301	
	21E	2002/0029261	03/07/2002	Shibata	709	219	
	21F	2002/0032752	03/14/2002	Gold et al.	709	218	
	21G	2002/0035501	03/21/2002	Handel et al.	705	10	
	21H	2002/0040297	04/04/2002	Tsiao et al.	704	257	
	21I	2002/0049535	04/25/2002	Rigo et al.	701	211	
	21J	2002/0049805	04/25/2002	Yamada et al.	709	202	
	21K	2002/0059068	05/16/2002	Rose et al.	704	246	
	21L	2002/0065568	05/30/2002	Silfvast et al.	700	94	
	21M	2002/0067839	06/06/2002	Heinrich	381	110	
	21N	2002/0069059	06/06/2002	Smith	704	257	
	21O	2002/0069071	06/06/2002	Knockeart et al.	704	275	
	21P	2002/0082911	06/27/2002	Dunn et al.	705	14	
	21Q	2002/0087312	07/04/2002	Lee et al.	704	251	
	21R	2002/0087326	07/04/2002	Lee et al.	704	270.1	
	21S	2002/0087525	07/04/2002	Abbott et al.	707	3	
	21T	2002/0107694	08/08/2002	Lerg	704	273	
	21U	2002/0120609	08/29/2002	Lang et al.	707	1	
	21V	2002/0124050	09/05/2002	Middeljans	709	203	
	21W	2002/0133354	09/19/2002	Ross et al.	704	275	

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INFORMATION DISCLOSURE CITATION IN AN APPLICATION	Docket Number	Application Number
	090611-0438199	*To be Determined*
	Applicant(s)	
	Larry BALDWIN *et al.*	
	Filing Date	Group Art Unit
Form PTO-1449	Herewith (April 20, 2015)	*To be Determined*

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*EXAMINER INITIAL	REF	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	22A	2002/0133402	09/19/2002	Faber et al.	705	14	
	22B	2002/0135618	09/26/2002	Maes et al.	345	767	
	22C	2002/0138248	09/26/2002	Corston-Oliver et al.	704	1	
	22D	2002/0143532	10/03/2002	McLean et al.	704	235	
	22E	2002/0143535	10/03/2002	Kist et al.	704	251	
	22F	2002/0161646	10/31/2002	Gailey et al.	705	14	
	22G	2002/0173333	11/21/2002	Buchholz et al.	455	527	
	22H	2002/0173961	11/21/2002	Guerra	704	258	
	22I	2002/0184373	12/05/2002	Maes	709	228	
	22J	2002/0188602	12/12/2002	Stubler et al.	707	3	
	22K	2002/0198714	12/26/2002	Zhou	704	252	
	22L	2003/0014261	01/16/2003	Kageyama	704	275	
	22M	2003/0016835	01/23/2003	Elko et al.	381	92	
	22N	2003/0046346	03/06/2003	Mumick et al.	709	205	
	22O	2003/0064709	04/03/2003	Gailey et al.	455	412	
	22P	2003/0065427	04/03/2003	Funk et al.	701	1	
	22Q	2003/0069734	04/10/2003	Everhart	704	275	
	22R	2003/0088421	05/08/2003	Maes et al.	704	270.1	
	22S	2003/0097249	05/22/2003	Walker et al.	704	1	
	22T	2003/0110037	06/12/2003	Walker et al.	704	257	
	22U	2003/0112267	06/19/2003	Belrose	345	728	
	22V	2003/0115062	06/19/2003	Walker et al.	704	258	
	22W	2003/0120493	06/26/2003	Gupta	704	270.1	

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	23A	2003/0135488	07/17/2003	Amir et al.	707	3	
	23B	2003/0144846	07/31/2003	Denenberg et al.	704	277	
	23C	2003/0158731	08/21/2003	Falcon et al.	704	231	
	23D	2003/0161448	08/28/2003	Parolkar et al.	379	88.17	
	23E	2003/0182132	09/25/2003	Niemoeller	704	275	
	23F	2003/0204492	10/30/2003	Wolf et al.	707	3	
	23G	2003/0206640	11/06/2003	Malvar et al.	381	93	
	23H	2003/0212550	11/13/2003	Ubale	704	215	
	23I	2003/0212558	11/13/2003	Matula	704	260	
	23J	2003/0212562	11/13/2003	Patel et al.	704	275	
	23K	2003/0225825	12/04/2003	Healey et al.	709	203	
	23L	2003/0236664	12/25/2003	Sharma	704	251	
	23M	2004/0006475	01/08/2004	Ehlen et al.	704	270.1	
	23N	2004/0010358	01/15/2004	Oesterling et al.	701	49	
	23O	2004/0025115	02/05/2004	Sienel et al.	715	513	
	23P	2004/0044516	03/04/2004	Kennewick et al.	704	5	
	23Q	2004/0098245	05/20/2004	Walker et al.	704	1	
	23R	2004/0117179	06/17/2004	Balasuriya	704	231	
	23S	2004/0117804	06/17/2004	Scahill et al.	719	320	
	23T	2004/0122674	06/24/2004	Bangalore et al.	704	276	
	23U	2004/0140989	07/22/2004	Papageorge	345	700	
	23V	2004/0158555	08/12/2004	Seedman et al.	707	3	
	23W	2004/0166832	08/26/2004	Portman et al.	455	412.1	

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	24A	2004/0167771	08/26/2004	Duan et al.	704	10	
	24B	2004/0172258	09/02/2004	Dominach et al.	704	277	
	24C	2004/0193408	09/30/2004	Hunt	704	209	
	24D	2004/0193420	09/30/2004	Kennewick et al.	704	257	
	24E	2004/0199375	10/07/2004	Ehsani et al.	704	4	
	24F	2004/0205671	10/14/2004	Sukehiro et al.	715	532	
	24G	2004/0243417	12/02/2004	Pitts, III et al.	704	276	
	24H	2005/0015256	01/20/2005	Kargman	704	272	
	24I	2005/0021334	01/27/2005	Iwahashi	704	240	
	24J	2005/0021470	01/27/2005	Martin et al.	705	51	
	24K	2005/0021826	01/27/2005	Kumar	709	232	
	24L	2005/0021331	01/27/2005	Huang et al.	704	231	
	24M	2005/0033574	02/10/2005	Kim et al.	704	251	
	24N	2005/0033582	02/10/2005	Gadd et al.	704	277	
	24O	2005/0043940	02/24/2005	Elder	704	9	
	24P	2005/0080632	04/14/2005	Endo et al.	704	277	
	24Q	2005/0114116	05/26/2005	Fiedler	704	201	
	24R	2005/0125232	06/09/2005	Gadd	704	270.1	
	24S	2005/0131673	06/16/2005	Koizumi et al.	704	2	
	24T	2005/0137850	06/23/2005	Odell	704	4	
	24U	2005/0137877	06/23/2005	Oesterling et al.	704	275	
	24V	2005/0143994	06/30/2005	Mori et al.	704	235	
	24W	2005/0144013	06/30/2005	Fujimoto et al.	704	277	

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	25A	2005/0216254	09/29/2005	Gupta et al.	704	9	
	25B	2005/0234727	10/20/2005	Chiu	704	270.1	
	25C	2005/0246174	11/03/2005	DeGolia	704	270	
	25D	2005/0283752	12/22/2005	Fruchter et al.	717	100	
	25E	2006/0041431	02/23/2006	Maes	704	270.1	
	25F	2006/0047509	03/02/2006	Ding et al.	704	231	
	25G	2006/0072738	04/06/2006	Louis et al.	379	265.02	
	25H	2006/0074671	04/06/2006	Farmaner et al.	704	257	
	25I	2006/0206310	09/14/2006	Ravikumar et al.	704	9	
	25J	2006/0217133	09/28/2006	Christenson et al.	455	461	
	25K	2006/0285662	12/21/2006	Yin et al.	379	88.16	
	25L	2007/0033005	02/08/2007	Cristo et al.	704	9	
	25M	2007/0033020	02/08/2007	(Kelleher) Francois et al.	704	226	
	25N	2007/0038436	02/15/2007	Cristo et al.	704	9	
	25O	2007/0038445	02/15/2007	Helbing et al.	704	235	
	25P	2007/0043569	02/22/2007	Potter, III et al.	704	270	
	25Q	2007/0043574	02/22/2007	Coffman et al.	704	275	
	25R	2007/0043868	02/22/2007	Kumar et al.	709	226	
	25S	2007/0050191	03/01/2007	Weider et al.	704	275	
	25T	2007/0055525	03/08/2007	Kennewick et al.	704	257	
	25U	2007/0061067	03/15/2007	Zeinstra et al.	701	200	
	25V	2007/0061735	03/15/2007	Hoffberg et al.	715	744	
	25W	2007/0073544	03/29/2007	Millett et al.	704	277	

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	26A	2007/0078708	04/05/2007	Yu et al.	705	14	
	26B	2007/0078709	04/05/2007	Rajaram	705	14	
	26C	2007/0094003	04/26/2007	Huang et al.	704	3	
	26D	2007/0118357	05/24/2007	Kasravi et al.	704	10	
	26E	2007/0135101	06/14/2007	Ramati et al.	455	414.1	
	26F	2007/0146833	06/28/2007	Satomi et al.	358	537	
	26G	2007/0162296	07/12/2007	Altberg et al.	705	1	
	26H	2007/0179778	08/02/2007	Gong et al.	704	9	
	26I	2007/0186165	08/09/2007	Maislos et al.	715	728	
	26J	2007/0198267	08/23/2007	Jones et al.	704	257	
	26K	2007/0203736	08/30/2007	Ashton	705	1	
	26L	2007/0214182	09/13/2007	Rosenberg	707	104.1	
	26M	2007/0250901	10/25/2007	McIntire et al.	725	146	
	26N	2007/0265850	11/15/2007	Kennewick et al.	704	257	
	26O	2007/0299824	12/27/2007	Pan et al.	707	3	
	26P	2008/0034032	02/07/2008	Healey et al.	709	203	
	26Q	2008/0065386	03/13/2008	Cross et al.	704	270	
	26R	2008/0091406	04/17/2008	Baldwin et al.	704	4	
	26S	2008/0103761	05/01/2008	Printz et al.	704	9	
	26T	2008/0109285	05/08/2008	Reuther et al.	705	7	
	26U	2008/0115163	05/15/2008	Gilboa et al.	725	34	
	26V	2008/0133215	06/05/2008	Sarukkai	704	2	
	26W	2008/0140385	06/12/2008	Mahajan et al.	704	9	
	26X	2008/0147396	06/19/2008	Wang	704	246	
	26Y	2008/0147410	06/19/2008	Odinak	704	270.1	
	26Z	2008/0154604	06/26/2008	Sathish et al.	704	257	

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	27A	2008/0162471	07/03/2008	Bernard	707	5	
	27B	2008/0177530	07/24/2008	Cross et al.	704	4	
	27C	2008/0189110	08/07/2008	Freeman et al.	704	251	
	27D	2008/0235023	09/25/2008	Kennewick et al.	704	257	
	27E	2008/0235027	09/25/2008	Cross	704	270.1	
	27F	2008/0319751	12/25/2008	Kennewick et al.	704	257	
	27G	2009/0052635	02/26/2009	Jones et al.	379	88.02	
	27H	2009/0067599	03/12/2009	Agarwal et al.	379	114.21	
	27I	2009/0076827	03/19/2009	Bulitta et al.	704	275	
	27J	2009/0106029	04/23/2009	DeLine et al.	704	275	
	27K	2009/0117885	05/07/2009	Roth	455	414.3	
	27L	2009/0144271	06/04/2009	Richardson et al.	707	5	
	27M	2009/0150156	06/11/2009	Kennewick et al.	704	257	
	27N	2009/0171664	07/02/2009	Kennewick et al.	704	257	
	27O	2009/0216540	08/27/2009	Tessel et al.	704	275	
	27P	2009/0259646	10/15/2009	Fujita et al.	707	5	
	27Q	2009/0271194	10/29/2009	Davis et al.	704	235	
	27R	2009/0273563	11/05/2009	Pryor	345	157	
	27S	2009/0276700	11/05/2009	Anderson et al.	715	700	
	27T	2009/0299745	12/03/2009	Kennewick et al.	704	257	
	27U	2009/0307031	12/10/2009	Winkler et al.	705	7	
	27V	2009/0313026	12/17/2009	Coffman et al.	704	275	
	27W	2010/0023320	01/28/2010	Di Cristo et al.	704	9	
	27X	2010/0029261	02/04/2010	Mikkelsen et al.	455	419	
	27Y	2010/0049501	02/25/2010	Kennewick et al.	704	9	
	27Z	2010/0049514	02/25/2010	Kennewick et al.	704	233	
	27AA	2010/0057443	03/04/2010	Di Cristo et al.	704	9	
	27BB	2010/0063880	03/11/2010	Atsmon et al.	705	14.53	
	27CC	2010/0036967	02/11/2010	Caine et al.	709	236	
	27DD	2010/0094707	04/15/2010	Freer	705	14.54	
	27EE	2010/0185512	07/22/2010	Borger et al.	705	14.49	
	27FF	2010/0145700	06/10/2010	Kennewick et al.	704	257	

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	28A	2010/0204986	08/12/2010	Kennewick et al.	704	226	
	28B	2010/0204994	08/12/2010	Kennewick et al.	704	257	
	28C	2010/0217604	08/26/2010	Baldwin et al.	704	275	
	28D	2010/0286985	11/11/2010	Kennewick et al.	704	257	
	28E	2010/0299142	11/25/2010	Freeman et al.	704	9	
	28F	2010/0312566	12/09/2010	Odinak et al.	704	275	
	28G	2011/0022393	01/27/2011	Waller et al.	704	270	
	28H	2011/0112827	05/12/2011	Kennewick et al.	704	9	
	28I	2011/0112921	05/12/2011	Kennewick et al.	705	26.1	
	28J	2011/0131036	06/02/2011	Di Cristo et al.	704	9	
	28K	2011/0131045	06/02/2011	Cristo et al.	704	249	
	28L	2011/0231182	09/22/2011	Weider et al.	704	9	
	28M	2011/0231188	09/22/2011	Kennewick et al.	704	236	
	28N	2012/0022857	01/26/2012	Baldwin et al.	704	9	
	28O	2012/0101809	04/26/2012	Kennewick et al.	704	9	
	28P	2012/0101810	04/26/2012	Kennewick et al.	704	9	
	28Q	2012/0109753	05/03/2012	Kennewick et al.	705	14.58	
	28R	2012/0150636	06/14/2012	Freeman et al.	705	14.49	
	28S	2012/0278073	11/01/2012	Weider et al.	704	235	
	28T	2013/0054228	02/28/2013	Baldwin et al.	704	9	
	28U	2013/0080177	03/28/2013	Chen	704	275	
	28V	2013/0211710	08/15/2013	Kennewick et al.	701	419	
	28W	2013/0253929	09/26/2013	Weider et al.	704	235	
	28X	2013/0297293	11/07/2013	Di Cristo et al.	704	9	
	28Y	2013/0304473	11/14/2013	Baldwin et al.	704	257	
	28Z	2013/0339022	12/19/2013	Baldwin et al.	704	257	
	28AA	2014/0012577	01/09/2014	Freeman et al.	704	249	
	28BB	2014/0108013	04/17/2014	Di Cristo et al.	704	254	
	28CC	2014/0156278	06/05/2014	Kennewick et al.	704	254	
	28DD	2014/0249821	09/04/2014	Kennewick et al.	704	257	
	28EE	2014/0249822	09/04/2014	Baldwin et al.	704	257	
	28FF	2014/0288934	09/25/2014	Kennewick et al.	704	254	

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	29A	2014/0365222	12/11/2014	Weider *et al.*	704	257	
	29B	2015/0019217	01/15/2015	Di Cristo et al.	704	235	
	29C	2015/0066627	03/05/2015	Freeman *et al.*	705	14.41	
	29D	2015/0073910	03/12/2015	Kennewick *et al.*	705	14.58	
	29E	2015/0095159	04/02/2015	Kennewick et al.	705	14.58	

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SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE

CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application is a continuation of U.S. Patent Application Serial No. 13/987,645, entitled "System and Method for a Cooperative Conversational Voice User Interface," filed August 19, 2013, which is a divisional of U.S. Patent Application Serial No. 13/251,712, entitled "System and Method for a Cooperative Conversational Voice User Interface," filed October 3, 2011 (which issued as U.S. Patent No. 8,515,765 on August 20, 2013), which is a continuation of U.S. Patent Application Serial No. 11/580,926, entitled "System and Method for a Cooperative Conversational Voice User Interface," filed October 16, 2006 (which issued as U.S. Patent No. 8,073,681 on December 6, 2011), each of which are hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

[002] The invention relates to a cooperative conversational model for a human to machine voice user interface.

BACKGROUND OF THE INVENTION

[003] Advances in technology, particularly within the convergence space, have resulted in an increase in demand for voice recognition software that can exploit technology in ways that are intuitive to humans. While communication between human beings is most often "cooperative," in that information and/or context is shared to advance mutual conversational goals, existing Human-to-Machine interfaces fail to provide the same level of intuitive interaction. For example, each human participant in a conversation can contribute to an exchange for the benefit of the exchange. This is done through shared assumptions and expectations regarding various aspects of the conversation, such as the topic, participant knowledge about the topic, expectations of the other participant's knowledge about the topic, appropriate word usage for the topic and/or participants, conversational development based on previous utterances, the participants' tone or inflection, the quality and quantity of

contribution expected from each participant, and many other factors. Participating in conversations that continually build and draw upon shared information is a natural and intuitive way for humans to converse.

[004] In contrast, complex Human-to-Machine interfaces do not allow users to exploit technology in an intuitive way, which inhibits mass-market adoption for various technologies. Incorporating a speech interface helps to alleviate this burden by making interaction easier and faster, but existing speech interfaces (when they actually work) still require significant learning on the part of the user. That is, existing speech interfaces are unable to bridge the gap between archaic Human-to-Machine interfaces and conversational speech that would make interaction with systems feel normal. Users should be able to directly request what they want from a system in a normal, conversational fashion, without having to memorize exact words or phrases. Alternatively, when users are uncertain of particular needs, they should be able to engage the system in a productive, cooperative dialogue to resolve their requests. Instead, existing speech interfaces force users to dumb down their requests to match simple sets of instructions in simple languages in order to communicate requests in ways that systems can understand. Using existing speech interfaces, there is virtually no option for dialogue between the user and the system to satisfy mutual goals.

[005] Therefore, existing systems lack a conversational speech model that can provide users with the ability to interact with systems in ways that are inherently intuitive to human beings. Existing systems suffer from these and other problems.

SUMMARY OF THE INVENTION

[006] According to various embodiments and aspects of the invention, a cooperative conversational voice user interface may understand free form human utterances, freeing users from being restricted to a fixed set of commands and/or requests. Rather, users can engage in cooperative conversations with a machine to complete a request or series of requests using a natural, intuitive, free form manner of expression.

[007] According to an aspect of the invention, an exemplary system architecture for implementing a cooperative conversational voice user interface is provided. The system may

receive an input, which may include a human utterance received by an input device, where the utterance may include one or more requests. As used herein, an "utterance" may be words, syllables, phonemes, or any other audible sound made by a human being. As used herein, a "request" may be a command, directive, or other instruction for a device, computer, or other machine to retrieve information, perform a task, or take some other action. In one implementation, the input may be a multi-modal input, where at least part of the multi-modal input is an utterance. The utterance component of the input may be processed by a speech recognition engine (which may alternatively be referred to as an Automatic Speech Recognizer or ASR) to generate one or more preliminary interpretations of the utterance. The one or more preliminary interpretations may then be provided to a conversational speech engine for further processing, where the conversational speech engine may communicate with one or more databases to generate an adaptive conversational response, which may be returned to the user as an output. In one implementation, the output may be a multi-modal output. For example, the utterance may include a request to perform an action, and the output may include a conversational response reporting success or failure, as well as an execution of the action.

[008] According to another aspect of the invention, an exemplary conversational speech engine may generate an adaptive conversational response to a request or series of requests. The conversational speech engine may include a free form voice search module that may understand an utterance made using typical, day-to-day language (i.e., in free form), and may account for variations in how humans normally speak, the vocabulary they use, and the conditions in which they speak. To account for intangible variables of human speech, the free form search module may include models of casual human speech. For example, in one implementation, the free form search module may understand specialized jargon and/or slang, tolerate variations in word order, and tolerate verbalized pauses or stuttered speech. For example, formalized English requests, where a verb precedes a noun, may be treated in an equivalent manner to requests where the noun precedes the verb. In another implementation, compound requests and/or compound tasks with multiple variables may be identified in a single utterance. By identifying all relevant information for completing one or more tasks from a single utterance, advantages may be provided over existing voice user interfaces, such as

Command and Control systems that use verbal menus to restrict information that a person can provide at a given point. In another implementation, inferring intended requests from incomplete or ambiguous requests may provide a conversational feel. By modeling what contextual signifiers, qualifiers, or other information may be required to perform a task in an identified context, an adaptive response may be generated, such as prompting a user for missing contextual signifiers, qualifiers, or other information. In one implementation, the response may ask for missing information in a way that most restricts possible interpretations, and the response may be framed to establish a domain for a subsequent user utterance. In another implementation, common alternatives for nouns and verbs may be recognized to reflect variations in usage patterns according to various criteria. Thus, variations in expression may be supported because word order is unimportant or unanticipated, and nouns and/or verbs may be represented in different ways to give simplistic, yet representative, examples. In another implementation, requests may be inferred from contradictory or otherwise inaccurate information, such as when an utterance includes starts and stops, restarts, stutters, run-on sentences, or other imperfect speech. For example, a user may sometimes change their mind, and thus alter the request in mid-utterance, and the imperfect speech feature may nonetheless be able to infer a request based on models of human speech. For example, various models may indicate that a last criterion is most likely to be correct, or intonation, emphasis, stress, use of the word "not," or other models may indicate which criterion is most likely to be correct.

[009] According to another aspect of the invention, the conversational speech engine may include a noise tolerance module that may discard words or noise which has no meaning in a given context to reduce a likelihood of confusion. Moreover, the noise tolerance module may filter out environmental and non-human noise to further reduce a likelihood of confusion. In one implementation, the noise tolerance module may cooperate with other modules and features to filter out words that do not fit into an identified context. For example, the noise tolerance module may filter other human conversations and/or utterances within a range of one or more microphones. For example, a single device may include multiple microphones, or multiple devices may each include one or more microphones, and the noise tolerance module may collate inputs and cooperatively filter out sound by comparing a speech signal from the

various microphones. The noise tolerance module may also filter out non-human environmental noise within range of the microphones, out-of-vocabulary words caused by speaker ambiguity or malapropisms, or other noise that may be unrelated to a target request. Performance benchmarks for the noise tolerance module may be defined by noise models based on human criteria. For example, if a driver of a car is 92% likely to be understood by a passenger when traveling at 65 miles-per-hour with windows cracked, then performance benchmarks for the noise tolerance module may have a similar performance under such conditions.

[010] According to another aspect of the invention, the conversational speech engine may include a context determination process that determines one or more contexts for a request to establish meaning within a conversation. The one or more contexts may be determined by having one or more context domain agents compete to determine a most appropriate domain for a given utterance. Once a given domain agent "wins" the competition, the winning domain agent may be responsible for establishing or inferring further contexts and updating short-term and long-term shared knowledge. If there is a deadlock between context domain agents, an adaptive conversational response may prompt the user to assist in disambiguating between the deadlocked agents. Moreover, the context determination process may infer intended operations and/or context based on previous utterances and/or requests, whereas existing systems consider each utterance independently, potentially making the same errors over and over again. For example, if a given interpretation turns out to be incorrect, the incorrect interpretation may be removed as a potential interpretation from one or more grammars associated with the speech recognition engine and/or from possible interpretations determined by the conversational speech engine, thereby assuring that a mistake will not be repeated for an identical utterance.

[011] The context determination process may provide advantages over existing voice user interfaces by continually updating one or more models of an existing context and establishing context as a by-product of a conversation, which cannot be established a priori. Rather, the context determination process may track conversation topics and attempt to fit a current utterance into recent contexts, including switching between contexts as tasks are completed,

partially completed, requested, etc. The context determination process may identify one or more context domains for an utterance by defining a collection of related functions that may be useful for users in various context domains. Moreover, each context domain may have relevant vocabularies and thought collections to model word groupings, which when evaluated together, may disambiguate one context domain from another. Thus, eliminating out-of-context words and noise words when searching for relevant combinations may enhance accuracy of inferences. This provides advantages over existing systems that attempt to assign meaning to every component of an utterance (i.e., including out-of-context words and noise words), which results in nearly infinite possible combinations and greater likelihood of confusion. The context determination process may also be self-aware, assigning degrees of certainty to one or more generated hypotheses, where a hypothesis may be developed to account for variations in environmental conditions, speaker ambiguity, accents, or other factors. By identifying a context, capabilities within the context, vocabularies within the context, what tasks are done most often historically in the context, what task was just completed, etc., the context determination process may establish intent from rather meager phonetic clues. Moreover, just as in human-to-human conversation, users may switch contexts at any time without confusion, enabling various context domains to be rapidly selected, without menu-driven dead ends, when an utterance is unambiguous.

[012] According to another aspect of the invention, an exemplary cooperative conversational model may build upon free form voice search, noise tolerance, and context determination to implement a conversational Human-to-Machine interface that reflects human interaction and normal conversational behavior. That is, the cooperative conversational model enables humans and machines to participant in a conversation with an accepted purpose or direction, with each participant contributing to the conversation for the benefit of the conversation. By taking advantage of human presumptions about utterances that humans rely upon, both as speakers and listeners, a Human-to-Machine interface may be analogous to everyday human-to-human conversation. In one implementation, the exemplary cooperative conversation model may take incoming data (shared knowledge) to inform a decision (intelligent hypothesis

building), and then may refine the decision and generate a response (adaptive response building).

[013] According to another aspect of the invention, shared knowledge may include both short-term and long-term knowledge. Short-term knowledge may accumulate during a single conversation, where input received during a single conversation may be retained. The shared knowledge may include cross-modality awareness, where in addition to accumulating input relating to user utterances, requests, locations, etc., the shared knowledge may accumulate a current user interface state relating to other modal inputs to further build shared knowledge models. The shared knowledge may be used to build one or more intelligent hypotheses using current and relevant information, build long-term shared knowledge by identifying information with long-term significance, and generate adaptive responses with relevant state and word usage information. Moreover, because cooperative conversations model human conversations, short-term session data may be expired after a psychologically appropriate amount of time, thereby humanizing system behavior, reducing a likelihood of contextual confusion based on stale data, while also adding relevant information from an expired session context to long-term knowledge models. Long-term shared knowledge may generally be user-centric, rather than session-based, where inputs may be accumulated over time to build user, environmental, cognitive, historical, or other long-term knowledge models. Long-term and short-term shared knowledge may be used simultaneously anytime a user engages in a cooperative conversation. Long-term shared knowledge may include explicit and/or implicit user preferences, a history of recent contexts, requests, tasks, etc., user-specific jargon related to vocabularies and/or capabilities of a context, most often used word choices, or other information. The long-term shared knowledge may be used to build one or more intelligent hypotheses using current and relevant information, generate adaptive responses with appropriate word choices when unavailable via short-term shared knowledge, refine long-term shared knowledge models, identify a frequency of specific tasks, identify tasks a user frequently has difficulty with, or provide other information and/or analysis to generate more accurate conversational responses. Shared knowledge may also be used to adapt a level of unprompted support (e.g., for novices versus experienced users, users who are frequently misrecognized, etc.) Thus, shared

knowledge may enable a user and a voice user interface to share assumptions and expectations such as topic knowledge, conversation history, word usage, jargon, tone, or other assumptions and/or expectations that facilitate a cooperative conversation between human users and a system.

[014] According to another aspect of the invention, a conversation type may be identified for any given utterance. Categorizing and developing conceptual models for various types of exchanges may consistently align user expectations and domain capabilities. One or more intelligent hypotheses may be generated as to a conversation type by considering conversational goals, participant roles, and/or an allocation of information among the participants. Based on the conversational goals, participant roles, and allocation of information, the intelligent hypotheses may consider various factors to classify a conversation (or utterance) into general types of conversations that can interact with one another to form many more variations and permutations of conversation types (e.g., a conversation type may change dynamically as information is reallocated from one participant to another, or as conversational goals change based on the reallocation of information).

[015] According to another aspect of the invention, the intelligent hypotheses may include one or more hypotheses of a user's intent in an utterance. In addition, the intelligent hypotheses may use short-term and/or long-term shared knowledge to proactively build and evaluate interaction with a user as a conversation progresses or over time. The hypotheses may model human-to-human interaction to include a varying degree of certainty for each hypothesis. That is, just as humans rely on knowledge shared by participants to examine how much and what kind of information was available, the intelligent hypotheses may leverage the identified conversation type and shared knowledge to generate a degree of certainty for each hypothesis.

[016] According to another aspect of the invention, syntactically, grammatically, and contextually sensitive "intelligent responses" may be generated from the intelligent hypotheses that can be used to generate a conversational experience for a user, while also guiding the user to reply in a manner favorable for recognition. The intelligent responses may create a conversational feel by adapting to a user's manner of speaking, framing responses

appropriately, and having natural variation and/or personality (e.g., by varying tone, pace, timing, inflection, word use, jargon, and other variables in a verbal or audible response).

[017] According to another aspect of the invention, the intelligent responses may adapt to a user's manner of speaking by using contextual signifiers and grammatical rules to generate one or more sentences that may cooperate with the user. By taking advantage of shared knowledge about how a user utters a request, the responses may be modeled using similar techniques used to recognize requests. The intelligent responses may rate possible responses statistically and/or randomize responses, which creates an opportunity to build an exchange with natural variation and conversational feel. This provides advantages over existing voice user interfaces where input and output is incongruous, as the input is "conversational" and the output is "computerese."

[018] According to another aspect of the invention, the intelligent responses may frame responses to influence a user reply utterance for easy recognition. For example, the responses may be modeled to illicit utterances from the user that may be more likely to result in a completed request. Thus, the responses may conform to a cooperative nature of human dialog and a natural human tendency to "parrot" what was just heard as part of a next utterance. Moreover, knowledge of current context may enhance responses to generate more meaningful conversational responses. Framing the responses may also deal with misrecognitions according to human models. For example, humans frequently remember a number of recent utterances, especially when one or more previous utterances were misrecognized or unrecognized. Another participant in the conversation may limit correction to a part of the utterance that was misrecognized or unrecognized, or over subsequent utterances and/or other interactions, clues may be provided to indicate the initial interpretation was incorrect. Thus, by storing and analyzing multiple utterances, utterances from earlier in a conversation may be corrected as the conversation progresses.

[019] According to another aspect of the invention, the intelligent responses may include multi-modal, or cross-modal, responses to a user. In one implementation, responses may be aware of and control one or more devices and/or interfaces, and users may respond by using whichever input method, or combination of input methods, is most convenient.

[020] According to another aspect of the invention, the intelligent responses may correct a course of a conversation without interrupting conversational flow. That is, even though the intelligent responses may be reasonably "sure," the intelligent responses may nonetheless sometimes be incorrect. While existing voice user interfaces tend to fail on average conversational missteps, normal human interactions may expect missteps and deal with them appropriately. Thus, responses after misrecognitions may be modeled after clarifications, rather than errors, and words may chosen in subsequent responses to move conversation forward and establish an appropriate domain to be explored with the user.

[021] Other objects and advantages of the invention will be apparent to those skilled in the art based on the following drawings and detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[022] Figure 1 is an exemplary block diagram of a system architecture according to one aspect of the invention.

[023] Figure 2 is an exemplary block diagram of a conversational speech engine according to one aspect of the invention.

[024] Figure 3 is an exemplary block diagram of a cooperative conversational model according to one aspect of the invention.

DETAILED DESCRIPTION

[025] Referring to Figure 1, an exemplary system architecture for implementing a cooperative conversational voice user interface is illustrated according to one aspect of the invention. The system may receive an input 105 from a user, where in one implementation, input 105 may be an utterance received by an input device (e.g., a microphone), where the utterance may include one or more requests. Input 105 may also be a multi-modal input, where at least part of the multi-modal input is an utterance. For example, the input device may include a combination of a microphone and a touch-screen device, and input 105 may include an utterance that includes a request relating to a portion of a display on the touch-screen device that the user is touching. For instance, the touch-screen device may be a navigation device, and input 105 may include an

utterance of "Give me directions to here," where the user may be requesting directions to a desired destination on the display of the navigation device.

[026] The utterance component of input 105 may be processed by a speech recognition engine 110 (which may alternatively be referred to herein as Automatic Speech Recognizer 110, or as shown in Fig. 1, ASR 110) to generate one or more preliminary interpretations of the utterance. The speech recognition engine 110 may process the utterance using any suitable technique known in the art. For example, in one implementation, the speech recognition engine 110 may interpret the utterance using techniques of phonetic dictation to recognize a phoneme stream, as described in U.S. Patent Application Serial No. 11/513,269, entitled "Dynamic Speech Sharpening," filed August 31, 2006, which issued as U.S. Patent No. 7,634,409 on December 15, 2009, and which is hereby incorporated by reference in its entirety. The one or more preliminary interpretations generated by the speech recognition engine 110 may then be provided to a conversational speech engine 115 for further processing. Conversational speech engine 115 may include a conversational language processor 120 and/or a voice search engine 125, described in greater detail in Fig. 2 below. Conversational speech engine 115 may communicate with one or more databases 130 to generate an adaptive conversational response, which may be returned to the user as an output 140. In one implementation, output 140 may be a multi-modal output and/or an interaction with one or more applications 145 to complete the request. For example, output 140 may include a combination of an audible response and a display of a route on a navigation device. For example, the utterance may include a request to perform an action, and output 140 may include a conversational response reporting success or failure, as well as an execution of the action. In addition, in various implementations, the speech recognition engine 110, conversational speech engine 115, and/or databases 130 may reside locally (e.g., on a user device), remotely (e.g., on a server), or a hybrid model of local and remote processing may be used (e.g., lightweight applications may be processed locally while computationally intensive applications may be processed remotely).

[027] Referring to Figure 2, an exemplary block diagram is provided illustrating a conversational speech engine 215 according to one aspect of the invention. Conversational speech engine 215 may include a conversational language processor 220 that generates an

adaptive conversational response to a request or series of requests using a free form voice search module 245, a noise tolerance module 250, and/or a context determination process 255. According to one aspect of the invention, modules 245-255 may communicate with a voice search engine 225 that includes one or more context domain agents 230 and/or one or more vocabularies 235 to aid in interpreting utterances and generating responses, as described in "Enhancing the VUE™ (Voce-User-Experience) Through Conversational Speech," by Tom Freeman and Larry Baldwin, which is herein incorporated by reference in its entirety. Conversational speech engine 215 may generate an adaptive conversational response to one or more requests, where the requests may depend on unspoken assumptions, incomplete information, context established by previous utterances, user profiles, historical profiles, environmental profiles, or other information. Moreover, conversational speech engine 215 may track which requests have been completed, which requests are being processed, and/or which requests cannot be processed due to incomplete or inaccurate information, and the response may be generated accordingly.

[028] According to one aspect of the invention, free form voice search module 245 may understand an utterance made using typical, day-to-day language (i.e., in free form), and may account for variations in how humans normally speak, the vocabulary they use, and the conditions in which they speak. Because variables such as stress, distraction, and serendipity are always different and infinitely varied, free form search module 245 may be designed with a goal of understanding that no human will come to the same Human-to-Machine interface situation in the same way twice. Thus, free form search module 245 may implement one or more features that model casual human speech. In various implementations, free form search module 245 may include, among other things, a free form utterance feature, a one-step access feature, an inferencing intended operations feature, an alternative expression feature, and/or an imperfect speech feature.

[029] The free form utterance feature may understand specialized jargon and/or slang, tolerate variations in word order (e.g., whether a subject of a request comes before or after a verb may be irrelevant), and tolerate verbalized pauses (e.g., "um," "ah," "eh," and other utterances without meaning). For example, the free form utterance feature may treat

formalized English verb-before-noun requests in an equivalent manner to free form requests where a noun may precede a verb. For example, user utterances of "Change it to the Squizz" and "You know, um, that Squizz channel, ah, switch it there" may be treated equivalently (where Squizz is a channel on XM Satellite Radio). In either case, the free form utterance feature is able to identify "Squizz" as a subject of the utterance and "Change it" or "switch it" as a verb or request for the utterance (e.g., by cooperating with context determination process 255, or other features, and identifying a relevant context domain agent 230 and/or vocabulary 235 to interpret the utterance).

[030] The one-step access feature may understand utterances that include compound requests with multiple variables. For example, a user utterance may be "What is the forecast for Boston this weekend?" The one-step access feature may identify "weather" as a context (e.g., by cooperating with context determination process 255, or other features, and identifying "forecast" as a synonym of "weather"), and search for a city equal to "Boston" and a time equal to "weekend." By identifying all relevant information for completing a task from a single utterance, the one-step access feature may overcome drawbacks of existing voice user interfaces, such as Command and Control systems that use verbal menus to restrict information that a person can provide at a given point (e.g., a Command and Control system for a phone directory service may say: "State please," . . . "City please," . . . "What listing," etc.). Moreover, some utterances may include compound requests, and the one-step access feature may decompose the compound requests into sub-tasks. For example, a user utterance of "I need to be at a meeting tomorrow in San Francisco at 8:00 am" may be decomposed into a set of sub-tasks such as (1) checking availability and reserving a flight on an evening before the meeting, (2) checking availability and reserving a hotel, (3) checking availability and reserving a car, etc., where users may further designate preferences for various tasks (e.g., first check availability on an airline for which the user is a frequent flyer). Depending on a level of shared knowledge about a user's preferences and/or historical patterns, the one-step access feature may infer additional tasks from a request. For example, in the above example, the one-step access feature may also check a weather forecast, and if the weather is "nice" (as defined by the user

preferences and/or as inferred from historical patterns), the one-step access feature may schedule a tee-time at a preferred golf course in San Francisco.

[031] The inferencing intended operations feature may identify an intended request from incomplete or ambiguous requests. For example, when a user utters "Route <indecipherable> Chicago <indecipherable> here," where the user intended to say "Route calculation to Chicago from here," the inferencing intended operations feature may model what is required to calculate a route (an origination point and a destination point). Because the utterance includes the origination point and the destination point, a request to calculate a route from the user's present location to Chicago may be inferred. Similarly, when the inferencing intended operations feature does not have sufficient information to infer a complete request, an adaptive conversational response may be generated to prompt the user for missing information. For example, when an utterance includes a request for a stock quote but not a company name (e.g., "Get me the stock price for <indecipherable>"), the response may be "What company's stock quote do you want?" The user may then provide an utterance including the company name, and the request may be completed. In one implementation, the response may ask for missing information in a way that most restricts possible interpretations (e.g., in a request for a task that requires both a city and a state, the state may be asked for first because there are fewer states than cities). Moreover, the inferencing intended operations feature may model compound tasks and/or requests by maintaining context and identifying relevant and/or missing information at both a composite and sub-task level.

[032] The alternative expression feature may recognize common alternatives for nouns and verbs to reflect variations in usage patterns according to various criteria. For example, users may vary expression based on age, socio-economics, ethnicity, user whims, or other factors. Thus, the alternative expression feature may support variations in expression where word order is unimportant or unanticipated. Alternatives in expression based on various criteria or demographics may be loaded into context domain agents 230 and/or vocabularies 235, and the alternative expression feature may update context domain agents 230 and/or vocabularies 235 based on inferred or newly discovered variations. In one implementation, conversational speech engine 215 may include a subscription interface to update changes to context domain

agents 230 and/or vocabularies 235 (e.g., a repository may aggregate various user utterances and deploy updates system wide). In operation, the alternative expression feature may allow nouns and/or verbs to be represented in different ways to give simplistic, yet representative, examples. For example, a user interested in a weather forecast for Washington, D.C. may provide any of the following utterances, each of which are interpreted equivalently: "What's the weather like in DC," "Is it raining inside the Beltway," Gimme the forecast for the capital," etc. Similarly, utterances of "Go to my home," "Go home," "Show route to home," and "I would like to know my way home" may all be interpreted equivalently, where a user profile may include the user's home address and a navigation route to the home address may be calculated.

[033] The imperfect speech feature may be able to infer requests from contradictory or otherwise inaccurate information, such as when an utterance includes starts and stops, restarts, stutters, run-on sentences, or other imperfect speech. For example, a user may sometimes change their mind, and thus alter the request in mid-utterance, and the imperfect speech feature may nonetheless be able to infer a request based on models of human speech. For example, for an utterance of "Well, I wanna . . . Mexi . . . no, steak restaurant please, I'm hungry," existing voice user interfaces make no assumptions regarding models of human speech and would be unable to infer whether the user wanted a Mexican or steak restaurant. The imperfect speech feature overcomes these drawbacks by using various models of human understanding that may indicate that a last criterion is most likely to be correct, or intonation, emphasis, stress, use of the word "not," or other models may indicate which criterion is most likely to be correct. Thus, in the above example, the imperfect speech feature may infer that the user wants a steak restaurant.

[034] According to one aspect of the invention, noise tolerance module 250 may be closely related to the imperfect speech feature, and may operate to discard words or noise that has no meaning in a given context so as not to create confusion. Moreover, noise tolerance module 250 may filter out environmental and non-human noise to further reduce a likelihood of confusion. In one implementation, noise tolerance module 250 may cooperate with other modules and features to filter out words that do not fit into a context. For example, one or

more contexts may be identified, and words that have no meaning with respect to system capabilities, random human utterances without meaning and other noise may be filtered out. Thus, noise tolerance module 250 may model real-world conditions to identify meaningful requests. For example, noise tolerance module 250 may filter other human conversations and/or utterances within a range of one or more microphones, For example, a single device may include multiple microphones, or multiple devices may each include one or more microphones, and the noise tolerance module may collate inputs and cooperatively filter out sound by comparing a speech signal from the various microphones. Noise tolerance module 250 may also filter out non-human environmental noise within the range of the microphones, out-of-vocabulary words, which could be a result of speaker ambiguity or malapropisms, or other noise that may be unrelated to a target request. Noise models in noise tolerance module 250 may define performance benchmarks based on human criteria. For example, if a driver of a car, traveling at 65 miles-per-hour, with windows cracked is 92% likely to be understood by a passenger, then noise tolerance module 250 may have a similar performance under those conditions.

[035] According to one aspect of the invention, conversational speech engine 215 may include a context determination process 255 that determines one or more contexts for a request to establish meaning within a conversation. The one or more contexts may be determined by having one or more context domain agents compete to determine a most appropriate domain for a given utterance, as described in U.S. Patent Application Serial No. 11/197,504, entitled "Systems and Methods for Responding to Natural Language Speech Utterance," filed August 5, 2005, which issued as U.S. Patent No. 7,640,160 on December 29, 2009 and U.S. Patent Application Serial No. 11/212,693, entitled "Mobile Systems and Methods of Supporting Natural Language Human-Machine Interactions," filed August 29, 2005, which issued as U.S. Patent No. 7,949,529 on May 24, 2011, both of which are hereby incorporated by reference in their entirety. Once a given context domain agent "wins" the competition, the winning agent may be responsible for establishing or inferring further contexts and updating short-term and long-term shared knowledge. If there is a deadlock between context domain agents, an adaptive conversational response may prompt the user to assist in disambiguating between the

deadlocked agents. For example, a user utterance of "What about traffic?" may have a distinct meaning in various contexts. That is, "traffic" may have a first meaning when the user is querying a system's media player (i.e., "traffic" would be a Rock and Roll band led by singer/songwriter Steve Winwood), a second meaning when the user is querying a search interface regarding Michael Douglas films (i.e., "traffic" would be a film directed by Steven Soderbergh), a third meaning when the user is querying a navigation device for directions to an airport (i.e., "traffic" would be related to conditions on roads along a route to the airport).

[036] Moreover, context determination process 255 may infer intended operations and/or context based on previous utterances and/or requests, whereas existing systems consider each utterance independently, potentially making the same errors over and over again. For example, if a given interpretation turns out to be incorrect, the incorrect interpretation may be removed as a potential interpretation from one or more grammars associated with the speech recognition engine and/or from possible subsequent interpretations determined by context determination process 255, thereby assuring that a mistake will not be repeated for an identical utterance.

[037] Context determination process 255 may overcome drawbacks of existing systems by continually updating one or more models of an existing context, where establishing context may be a by-product of a conversation, which cannot be established a priori. Context determination process 255 may establish a first context domain, change to a second context domain, change back to the first context domain, and so on, as tasks are completed, partially completed, requested, etc, and a context stack may track conversation topics and attempt to fit a current utterance into a most-recent context, next-most-recent topic, etc., traversing the context stack until a most likely intent can be established. For example, a user may utter "What's the traffic report," and context determination process 255 may establish Traffic as a context, and return an output including a traffic report, which does not happen to mention traffic on Interstate-5. The user may then utter "What about I-5?" and context determination process 255 may know that the current context is Traffic, a traffic report including information about Interstate-5 may be searched for, and the traffic report indicating that Interstate-5 is crowded may be returned as an output. The user may then utter "Is there a faster way?" and

context determination module 255 may know that the current context is still Traffic, and may search for routes to a specified destination with light traffic and avoiding Interstate-5. Moreover, context determination process 255 may build context based on user profiles, environmental profiles, historical profiles, or other information to further refine the context. For example, the profiles may indicate that Interstate-5 is a typical route taken Monday through Friday.

[038] The profiles may be particularly meaningful when attempting to disambiguate between contexts where a word has different meanings in different contexts. For example, a user may utter "What's the weather in Seattle?" and context determination process 255 may establish Weather as a context, as well as establishing Seattle as an environmental context. The user may then utter "and Portland?" and context determination process 255 may return a weather report for Portland, Oregon based on the Weather and an environmental proximity between Portland, Oregon and Seattle, Washington. The user may then ask "What time does the game start?"" and a search for sports events with teams from Seattle and/or Portland may occur, with results presented conversationally according to methods described in greater detail below in Figure 3. Correlatively, had user originally uttered "What's the weather in Portsmouth, New Hampshire," in the second utterance, context determination process 255 may instead retrieve a weather report for Portland, Maine based on an environmental proximity to New Hampshire. Moreover, when environmental profiles, contextual shared knowledge, and/or other short-term and/or long-term shared knowledge does not provide enough information to disambiguate between possibilities, responses may prompt the user with a request for further information (e.g., "Did you mean Portland, Maine, or Portland, Oregon?").

[039] Context determination process 255 may cooperate with context domain agents 230, where each context domain agent 230 may define a collection of related functions that may be useful for users. Moreover, each context domain agent 230 may include a relevant vocabulary 235 and thought collections that model word groupings, which when evaluated together, may disambiguate one context domain from another (e.g., a Music context domain agent 230 may include a vocabulary 235 for songs, artists, albums, etc., whereas a Stock context domain agent 230 may include a vocabulary 235 for company names, ticker symbols, financial metrics, etc.).

Thus, accuracy in identifying meaning may be enhanced by eliminating out-of-context words and noise words when searching for relevant combinations. In contrast, existing systems attempt to assign meaning to every component of an utterance (e.g., including out-of-context words and noise words), which results in nearly infinite possible combinations and greater likelihood of confusion. Moreover, context domain agents 230 may include metadata for each criteria to further assist in interpreting utterances, inferring intent, completing incomplete requests, etc. (e.g., a Space Needle vocabulary word may include metadata for Seattle, landmark, tourism, Sky City restaurant, etc.). Given a disambiguated criterion, context determination process 255 may thus be able to automatically determine other information needed to complete a request, discard importance of word order, and perform other enhancements for conversational speech.

[040] Context domain agents 230 may also be self-aware, assigning degrees of certainty to one or more generated hypotheses, where a hypothesis may be developed to account for variations in environmental conditions, speaker ambiguity, accents, or other factors. Conceptually, context domain agents 230 may be designed to model utterances as a hard-of-hearing person would at a noisy party. By identifying a context, capabilities within the context, vocabularies within the context, what tasks are done most often historically in the context, what task was just completed, etc., a context domain agent 230 may establish intent from rather meager phonetic clues. Moreover, the context stack may be one of a plurality of components for establishing context, and thus not a constraint upon the user. All context domains may be accessible, allowing the user to switch contexts at any time without confusion. Thus, just as in human-to-human conversation, context domains may be rapidly selected, without menu-driven dead ends, when an utterance is unambiguous. For example, a user may utter, "Please call Rich Kennewick on his cell phone," and a system response of "Do you wish me to call Rich Kennewick on his cell?" may be generated. The user may decide at that point to call Rich Kennewick later, and instead, listen to some music. Thus, the user may then utter, "No, play the Louis Armstrong version of Body and Soul from my iPod," and a system response of "Playing Body and Soul by Louis Armstrong" may be generated as Body and Soul is played through a media player. In this example, the later utterance has no contextual connection to

the first utterance, yet because request criteria in the utterances are unambiguous, contexts can be switched easily without relying on the context stack.

[041] Referring to Figure 3, an exemplary cooperative conversational model 300 is illustrated according to an aspect of the invention. Cooperative conversational model 300 may build upon free form voice search 245, noise tolerance 250, and context determination 255 to implement a conversational Human-to-Machine interface that reflects how humans interact with each other and their normal behavior in conversation. Simply put, cooperative conversational model 300 enables humans and machines to participate in a conversation with an accepted purpose or direction, with each participant contributing to the conversation for the benefit of the conversation. That is, cooperative conversational model 300 incorporates technology and process-flow that takes advantage of human presumptions about utterances that humans rely upon, both as speakers and listeners, thereby creating a Human-to-Machine interface that is analogous to everyday human-to-human conversation. In one implementation, a cooperative conversation may take incoming data (shared knowledge) 305 to inform a decision (intelligent hypothesis building) 310, and then may refine the decision and generate a response (adaptive response building) 315.

[042] According to one aspect of the invention, shared knowledge 305 includes both short-term and long-term knowledge about incoming data. Short-term knowledge may accumulate during a single conversation, while long-term knowledge may accumulate over time to build user profiles, environmental profiles, historical profiles, cognitive profiles, etc.

[043] Input received during a single conversation may be retained in a Session Input Accumulator. The Session Input Accumulator may include cross-modality awareness, where in addition to accumulating input relating to user utterances, requests, locations, etc., the Session Input Accumulator may accumulate a current user interface state relating to other modal inputs to further build shared knowledge models and more accurate adaptive responses (e.g., when a user utters a request relating to a portion of a touch-screen device, as described above). For example, the Session Input Accumulator may accumulate inputs including recognition text for each utterance, a recorded speech file for each utterance, a list-item selection history, a graphical user interface manipulation history, or other input data. Thus, the Session Input

Accumulator may populate Intelligent Hypothesis Builder 310 with current and relevant information, build long-term shared knowledge by identifying information with long-term significance, provide Adaptive Response Builder 315 with relevant state and word usage information, retain recent contexts for use with Intelligent Hypothesis Builder 310, and/or retain utterances for reprocessing during multi-pass evaluations. Moreover, because cooperative conversations 300 model human conversations, short-term session data may be expired after a psychologically appropriate amount of time, thereby humanizing system behavior. For example, a human is unlikely to recall a context of a conversation from two years ago, but because the context would be identifiable by a machine, session context is expired after a predetermined amount of time to reduce a likelihood of contextual confusion based on stale data. However, relevant information from an expired session context may nonetheless be added to user, historical, environmental, cognitive, or other long-term knowledge models.

[044] Long-term shared knowledge may generally be user-centric, rather than session-based. That is, inputs may be accumulated over time to build user, environmental, cognitive, historical, or other long-term knowledge models. Long-term and short-term shared knowledge (collectively, shared knowledge 305) may be used simultaneously anytime a user engages in a cooperative conversation 300. Long-term shared knowledge may include explicit and/or implicit user preferences, a history of most recently used agents, contexts, requests, tasks, etc., user-specific jargon related to vocabularies and/or capabilities of an agent and/or context, most often used word choices, or other information. The long-term shared knowledge may be used to populate Intelligent Hypothesis Builder 310 with current and relevant information, provide Adaptive Response Builder 315 with appropriate word choices when the appropriate word choices are unavailable via the Session Input Accumulator, refine long-term shared knowledge models, identify a frequency of specific tasks, identify tasks a user frequently has difficulty with, or provide other information and/or analysis to generate more accurate conversational responses.

[045] As described above, shared knowledge 305 may be used to populate Intelligent Hypothesis Builder 310, such that a user and a voice user interface may share assumptions and expectations such as topic knowledge, conversation history, word usage, jargon, tone (e.g.,

formal, humorous, terse, etc.), or other assumptions and/or expectations that facilitate interaction at a Human-to-Machine interface.

[046] According to an aspect of the invention, one component of a successful cooperative conversation may be identifying a type of conversation from an utterance. By categorizing and developing conceptual models for various types of exchanges, user expectations and domain capabilities may be consistently aligned. Intelligent Hypothesis Builder 310 may generate a hypothesis as to a conversation type by considering conversational goals, participant roles, and/or an allocation of information among the participants. Conversational goals may broadly include: (1) getting a discrete piece of information or performing a discrete task, (2) gathering related pieces of information to make a decision, and/or (3) disseminating or gathering large amounts of information to build expertise. Participant roles may broadly include: (1) a leader that controls a conversation, (2) a supporter that follows the leader and provides input as requested, and/or (3) a consumer that uses information. Information may be held by one or more of the participants at the outset of a conversation, where a participant may hold most (or all) of the information, little (or none) of the information, or the information may be allocated roughly equally amongst the participants. Based on the conversational goals, participant roles, and allocation of information, Intelligent Hypothesis Builder 310 may consider various factors to classify a conversation (or utterance) into general types of conversations that can interact with one another to form many more variations and permutations of conversation types (e.g., a conversation type may change dynamically as information is reallocated from one participant to another, or as conversational goals change based on the reallocation of information).

[047] For example, in one implementation, a query conversation may include a conversational goal of getting a discrete piece of information or performing a particular task, where a leader of the query conversation may have a specific goal in mind and may lead the conversation toward achieving the goal. The other participant may hold the information and may support the leader by providing the information. In a didactic conversation, a leader of the conversation may control information desired by a supporter of the conversation. The supporter's role may be limited to regulating an overall progression of the conversation and interjecting queries for clarification. In an exploratory conversation, both participants share leader and supporter

roles, and the conversation may have no specific goal, or the goal may be improvised as the conversation progresses. Based on this model, Intelligent Hypothesis Builder 310 may broadly categorize a conversation (or utterance) according to the following diagram:

QUERY		
	Participant A	*Participant B*
	User	Voice User Interface
GOAL	Get information/action	Provide information/action
ROLE	Leader/Consumer	Supporter/Dispenser
INFORMATION ALLOCATION	Less	More

DIDACTIC		
	Participant A	*Participant B*
	User	Voice User Interface
GOAL	Get information	Provide information
ROLE	Follower/Consumer	Leader/Dispenser
INFORMATION ALLOCATION	Less	More

EXPLORATORY		
	Participant A	*Participant B*
	User	Voice User Interface
GOAL	Gather/share information	Gather/share information
ROLE	Follower/Consumer and Leader/Dispenser	Follower/Consumer and Leader/Dispenser
INFORMATION ALLOCATION	Equal or alternating	Equal or alternating

[048] Intelligent Hypothesis Builder 310 may use an identified conversation type to assist in generating a set of hypotheses as to a user's intent in an utterance. In addition, Intelligent Hypothesis Builder 310 may use short-term shared knowledge from the Session Input Accumulator to proactively build and evaluate interaction with a user as a conversation progresses, as well as long-term shared knowledge to proactively build and evaluate interaction with the user over time. Intelligent Hypothesis Builder 310 may thus adaptively arrive at a set of N-best hypotheses about user intent, and the N-best hypotheses may be provided to an Adaptive Response Builder 315. In addition, Intelligent Hypothesis Builder 310 may model human-to-human interaction by calculating a degree of certainty for each of the hypotheses. That is, just as humans rely on knowledge shared by participants to examine how much and what kind of information was available, Intelligent Hypothesis Builder 310 may leverage the identified conversation type and short-term and long-term shared knowledge to generate a degree of certainty for each hypothesis.

[049] According to another aspect of the invention, Intelligent Hypothesis Builder 310 may generate one or more explicit hypotheses of a user's intent when an utterance contains all information (including qualifiers) needed to complete a request or task. Each hypothesis may have a corresponding degree of certainty, which may be used to determine a level of unprompted support to provide in a response. For example, a response may include a confirmation to ensure the utterance was not misunderstood or the response may adaptively prompt a user to provide missing information.

[050] According to another aspect of the invention, Intelligent Hypothesis Builder 310 may use short-term knowledge to generate one or more implicit hypotheses of a user's intent when an utterance may be missing required qualifiers or other information needed to complete a request or task. Each hypothesis may have a corresponding degree of certainty. For instance, when a conversation begins, short-term knowledge stored in the Session Input Accumulator may be empty, and as the conversation progresses, the Session Input Accumulator may build a history of the conversation. Intelligent Hypothesis Builder 310 may use data in the Session Input Accumulator to supplement or infer additional information about a current utterance. For example, Intelligent Hypothesis Builder 310 may evaluate a degree of certainty based on a

number of previous requests relevant to the current utterance. In another example, when the current utterance contains insufficient information to complete a request or task, data in the Session Input Accumulator may be used to infer missing information so that a hypothesis can be generated. In still another example, Intelligent Hypothesis Builder 310 may identify syntax and/or grammar to be used by Adaptive Response Builder 315 to formulate personalized and conversational response. In yet another example, when the current utterance contains a threshold amount of information needed to complete a request or task, data in the Session Input Accumulator may be relied upon to tune a degree of certainty.

[051] According to another aspect of the invention, Intelligent Hypothesis Builder 310 may use long-term shared knowledge to generate one or more implicit hypotheses of a user's intent when an utterance is missing qualifiers or other information needed to complete a request or task. Each hypothesis may have a corresponding degree of certainty. Using long-term knowledge may be substantially similar to using short-term shared knowledge, except that information may be unconstrained by a current session, and an input mechanism may include information from additional sources other than conversational sessions. For example, Intelligent Hypothesis Builder 310 may use information from long-term shared knowledge at any time, even when a new conversation is initiated, whereas short-term shared knowledge may be limited to an existing conversation (where no short-term shared knowledge would be available when a new conversation is initiated). Long-term shared knowledge may come from several sources, including user preferences or a plug-in data source (e.g., a subscription interface to a remote database), expertise of a user (e.g., based on a frequency of errors, types of tasks requested, etc., the user may be identified as a novice, intermediate, experienced, or other type of user), agent-specific information and/or language that may also apply to other agents (e.g., by decoupling information from an agent to incorporate the information into other agents), frequently used topics passed in from the Session Input Accumulator, frequently used verbs, nouns, or other parts of speech, and/or other syntax information passed in from the Session Input Accumulator, or other sources of long-term shared knowledge may be used.

[052] According to another aspect of the invention, knowledge-enabled utterances, as generated by Intelligent Hypothesis Builder 310, may include one or more explicit (supplied by

a user), and one or more implicit (supplied by Intelligent Hypothesis Builder 310) contextual signifiers, qualifiers, criteria, and other information that can be used to identify and evaluate relevant tasks. At that point, Intelligent Hypothesis Builder 310 may provide an input to Adaptive Response Builder 315. The input received by Adaptive Response Builder 315 may include at least a ranked list of hypotheses, including explicit and/or implicit hypotheses, each of which may have a corresponding degree of certainty. A hypothesis may be assigned one of four degrees of certainty: (1) "sure," where contextual signifiers and qualifiers relate to one task, context and qualifiers relate to one task, and a confidence level associated with a preliminary interpretation generated at the speech recognition engine exceeds a predetermined threshold; (2) "pretty sure," where contextual signifiers and qualifiers relate to more than one task (select top-ranked task) and criteria relates to one request, and/or the confidence level associated with the preliminary interpretation generated at the speech recognition engine is below the predetermined threshold; (3) "not sure," where additional contextual signifiers or qualifiers are needed to indicate or rank a task; and (4) "no hypothesis," where little or no information can be deciphered. Each degree of certainty may further be classified as explicit or implicit, which may be used to adjust a response. The input received by Adaptive Response Builder 310 may also include a context, user syntax and/or grammar, context domain agent specific information and/or preferences (e.g., a travel context domain agent may know a user frequently requests information about France, which may be shared with a movie context domain agent so that responses may occasionally include French movies).

[053] According to another aspect of the invention, Adaptive Response Builder 315 may build syntactically, grammatically, and contextually sensitive "intelligent responses" that can be used with one or more agents to generate a conversational experience for a user, while also guiding the user to reply in a manner favorable for recognition. In one implementation, the intelligent responses may include a verbal or audible reply played through an output device (e.g., a speaker), and/or an action performed by a device, computer, or machine (e.g., downloading a web page, showing a list, executing an application, etc.). In one implementation, an appropriate response may not require conversational adaptation, and default replies and/or randomly selected response sets for a given task may be used.

[054] According to another aspect of the invention, Adaptive Response Builder 310 may draw on information maintained by Intelligence Hypothesis Builder 310 to generate responses that may be sensitive to context, task recognition of a current utterance, what a user already knows about a topic, what an application already knows about the topic, shared knowledge regarding user preferences and/or related topics, appropriate contextual word usage (e.g., jargon), words uttered by the user in recent utterances, conversational development and/or course correction, conversational tone, type of conversation, natural variation in wording of responses, or other information. As a result, Adaptive Response Builder 315 may generate intelligent responses that create conversational feel, adapt to information that accumulates over a duration of a conversation, maintain cross-modal awareness, and keep the conversation on course.

[055] According to another aspect of the invention, Adaptive Response Builder 315 may create a conversational feel by adapting to a user's manner of speaking, framing responses appropriately, and having natural variation and/or personality (e.g., by varying tone, pace, timing, inflection, word use, jargon, and other variables in a verbal or audible response). Adapting to a user's manner of speaking may include using contextual signifiers and grammatical rules to generate one or more sentences for use as response sets that may cooperate with the user. By taking advantage of short-term (from the Session Input Accumulator) and long-term (from one or more profiles) shared knowledge about how a user utters a request, the responses may be modeled using techniques used to recognize requests. Adaptive Response Builder 315 may rate possible responses statistically and/or randomize responses, which creates an opportunity to build an exchange with natural variation and conversational feel. This may be a significant advantage over existing voice user interfaces with incongruous input and output, where the input is "conversational" and the output is "computerese." The following examples may demonstrate how a response may adapt to a user's input word choices and manner of speaking:

User	**Do you know** [*mumbled words*] Seattle [*more mumbled words*]?
Voice User Interface	Did you want Seattle sports scores, weather, traffic, or news?

User	**Find me** [*mumbled words*] Seattle [*more mumbled words*]?
Voice User Interface	I *found* Seattle, did you want sports scores, weather, traffic, or news?

User	**Get me** [*mumbled words*] Seattle [*more mumbled words*]?
Voice User Interface	I've *got* Seattle, did you want me to *get* sports scores, weather, traffic, or news?

[056] According to another aspect of the invention, Adaptive Response Builder 315 may frame responses to influence a user to reply with an utterance that may be easily recognized. For example, a user may utter, "Get me the news" and a voice user interface response may be "Which of these categories? Top news stories, international news, political news, or sports news?" The response may be likely to illicit utterances from the user, such as "Top news stories" or "International news," which are more likely to result in a completed request. Thus, the responses may conform to a cooperative nature of human dialog, and a natural human tendency to "parrot" what was just heard as part of a next utterance. Moreover, knowledge of current context may enhance responses to generate more meaningful conversational responses, such as in the following exchange:

User	What's the weather like in Dallas?
Voice User Interface	In Dallas, it's sunny and 90 degrees.
User	What theaters are showing the movie "The Fantastic Four" there?
Voice User Interface	10 theaters in Dallas are showing "The Fantastic Four." Do you want show times for a particular theater?

[057] Framing the responses may also deal with misrecognitions according to human models. For example, humans frequently remember a number of recent utterances, especially when one or more previous utterances were misrecognized or unrecognized. Another participant in the conversation may limit correction to a part of the utterance that was misrecognized or unrecognized, or over subsequent utterances and/or other interactions, clues may be provided to indicate the initial interpretation was incorrect. Thus, by storing and analyzing multiple utterances, utterances from earlier in a conversation may be corrected as the conversation progresses.

[058] According to another aspect of the invention, Adaptive Response Builder 315 may generate multi-modal, or cross-modal, responses to a user. In one implementation, responses may be aware of and control one or more devices and/or interfaces, and users may respond by using whichever input method, or combination of input methods, is most convenient. For example, a response asking the user to direct an utterance with a "Yes" or "No" in a multi-modal environment may also display alternatives visually.

[059] According to another aspect of the invention, Adaptive Response Builder 315 may correct a course of a conversation without interrupting conversational flow. Adaptive Response Builder 315 may generate intelligent responses based on the ranked list of hypotheses and corresponding degrees of certainty, which may be used to correct a course of a conversation without interrupting conversational flow. That is, even though the intelligent responses may be reasonably "sure," the intelligent responses may nonetheless sometimes be incorrect. While existing voice user interfaces tend to fail on average conversational missteps, normal human interactions may expect missteps and deal with them appropriately. Thus, responses after a misrecognition may be modeled after clarifications, rather than errors, and words may chosen in subsequent responses that move conversation forward and establish an appropriate domain to be explored with the user. For example, course correction may result in the following exchange:

User	Can you **get** [*mumbled words here*] Mariners [*more mumbled words*]?
Voice User Interface	*I've got* the score for the Mariners game? 4-2 Mariners.
User	No, the start time for tomorrow's game.
Voice User Interface	Oh, 7:05.

[060] The above disclosure has been described in terms of specific exemplary aspects, implementations, and embodiments of the invention. However, those skilled in the art will recognize various changes and modifications that may be made without departing from the scope and spirit of the invention. Therefore, the specification and drawings are to be regarded as exemplary only, and the scope of the invention is to be determined solely by the appended claims.

CLAIMS

What is claimed is:

1. A computer-implemented method of facilitating natural language system responses, the method being implemented by a computer system that includes one or more physical processors executing one or more computer program instructions which, when executed, perform the method, the method comprising:

accumulating, by the computer system, short-term knowledge, wherein the short-term knowledge is accumulated based on one or more natural language utterances received during a predetermined time period;

receiving, at the computer system, a first natural language utterance from an input device;

determining, by the computer system, based on the short-term knowledge, a first context for the first natural language utterance;

determining, by the computer system, based on the first context, an interpretation of the first natural language utterance; and

generating, by the computer system, based on the interpretation of the first natural language utterance, a first response to the first natural language utterance.

2. The method of claim 1, wherein the one or more natural language utterances received during the predetermined time period are related to a conversation between a user and the computer system.

3. The method of claim 1, further comprising:

receiving, at the computer system, a second natural language utterance from the input device;

determining, by the computer system, based on the short-term knowledge, whether the second natural language utterance corresponds to the first context;

determining, by the computer system, responsive to the second natural language utterance not corresponding to the first context, a second context for the second natural language utterance based on the short-term knowledge;

determining, by the computer system, based on the second context, an interpretation of the second natural language utterance; and

generating, by the computer system, based on the interpretation of the second natural language utterance, a second response to the second natural language utterance.

4. The method of claim 1, further comprising:

tracking, by the computer system, contexts identified for multiple consecutive natural language user utterances to generate a context stack, the context stack including the contexts identified for the multiple consecutive natural language user utterances;

receiving, at the computer system, a third natural language utterance from the input device;

determining, by the computer system, based on the short-term knowledge, whether the third natural language utterance corresponds to one or more individual ones of the contexts included in the context stack.

5. The method of claim 4, wherein determining whether the third natural language utterance corresponds to one or more individual ones of the contexts included in the context stack includes:

determining whether the third natural language utterance corresponds to a most recent context included in the context stack; and

responsive to the third natural language utterance not corresponding to the most recent context, determining whether the third natural language utterance corresponds to a second most recent context included in the context stack.

6. The method of claim 4, further comprising:

determining, by the computer system, responsive to the third natural language utterance not corresponding to one or more individual ones of the contexts included in the context stack, a third context for the third natural language utterance based on the short-term knowledge; and

determining, by the computer system, based on the third context, an interpretation of the third natural language utterance.

7. The method of claim 1, wherein determining the interpretation of the first natural language utterance comprises determining, based on the first context, an interpretation of one or more recognized words of the first natural language utterance.

8. The method of claim 1, further comprising:

expiring, by the computer system, one or more items of short-term knowledge that are based on one or more natural language utterances received prior to the predetermined time period.

9. The method of claim 8, further comprising:

accumulating, by the computer system, long-term knowledge based on the one or more items of short-term knowledge that are expired.

10. The method of claim 1, further comprising:

accumulating, by the computer system, long-term knowledge, wherein the long-term knowledge is accumulated based on one or more natural language utterances received prior to the predetermined time period;

wherein the first context is determined based on the short-term knowledge and the long-term knowledge.

11. The method of claim 1, further comprising:

determining, by the computer system, based on the short-term knowledge, a manner in which the first natural language utterance is spoken,

wherein the first response is generated based on the determined manner and the interpretation of the first natural language utterance.

12. The method of claim 11, wherein the manner in which the first natural language utterance is spoken includes at least one of a tone, a pace, an inflection, or a timing.

13. A system for facilitating natural language system responses, the system comprising:

one or more physical processors programmed with one or more computer program instructions which, when executed, cause the one or more physical processors to:

accumulate short-term knowledge, wherein the short-term knowledge is accumulated based on one or more natural language utterances received during a predetermined time period;

receive a first natural language utterance from an input device;

determine, based on the short-term knowledge, a first context for the first natural language utterance;

determine, based on the first context, an interpretation of the first natural language utterance; and

generate, based on the interpretation of the first natural language utterance, a first response to the first natural language utterance.

14. The system of claim 13, wherein the one or more natural language utterances received during the predetermined time period are related to a conversation between a user and the system.

15. The system of claim 13, wherein the one or more physical processors are caused to:

receive a second natural language utterance from the input device;

determine, based on the short-term knowledge, whether the second natural language utterance corresponds to the first context;

determine, responsive to the second natural language utterance not corresponding to the first context, a second context for the second natural language utterance based on the short-term knowledge;

determine, based on the second context, an interpretation of the second natural language utterance; and

generate, based on the interpretation of the second natural language utterance, a second response to the second natural language utterance.

16. The system of claim 13, wherein the one or more physical processors are caused to:

track contexts identified for multiple consecutive natural language user utterances to generate a context stack, the context stack including the contexts identified for the multiple consecutive natural language user utterances;

receive a third natural language utterance from the input device;

determine, based on the short-term knowledge, whether the third natural language utterance corresponds to one or more individual ones of the contexts included in the context stack.

17. The system of claim 16, wherein determining whether the third natural language utterance corresponds to one or more individual ones of the contexts included in the context stack includes:

determining whether the third natural language utterance corresponds to a most recent context included in the context stack; and

responsive to the third natural language utterance not corresponding to the most recent context, determining whether the third natural language utterance corresponds to a second most recent context included in the context stack.

18. The system of claim 16, wherein the one or more physical processors are caused to:

determine, responsive to the third natural language utterance not corresponding to one or more individual ones of the contexts included in the context stack, a third context for the third natural language utterance based on the short-term knowledge; and

determine, based on the third context, an interpretation of the third natural language utterance.

19. The system of claim 13, wherein determining the interpretation of the first natural language utterance comprises determining, based on the first context, an interpretation of one or more recognized words of the first natural language utterance.

20. The system of claim 13, wherein the one or more physical processors are caused to:

expire one or more items of accumulated short-term knowledge that are based on one or more natural language utterances received prior to the predetermined time period; and

accumulate long-term knowledge based on the one or more items of accumulated short-term knowledge that are expired,

wherein the first context is determined based on the short-term knowledge and the long-term knowledge.

ABSTRACT

A cooperative conversational voice user interface is provided. The cooperative conversational voice user interface may build upon short-term and long-term shared knowledge to generate one or more explicit and/or implicit hypotheses about an intent of a user utterance. The hypotheses may be ranked based on varying degrees of certainty, and an adaptive response may be generated for the user. Responses may be worded based on the degrees of certainty and to frame an appropriate domain for a subsequent utterance. In one implementation, misrecognitions may be tolerated, and conversational course may be corrected based on subsequent utterances and/or responses.

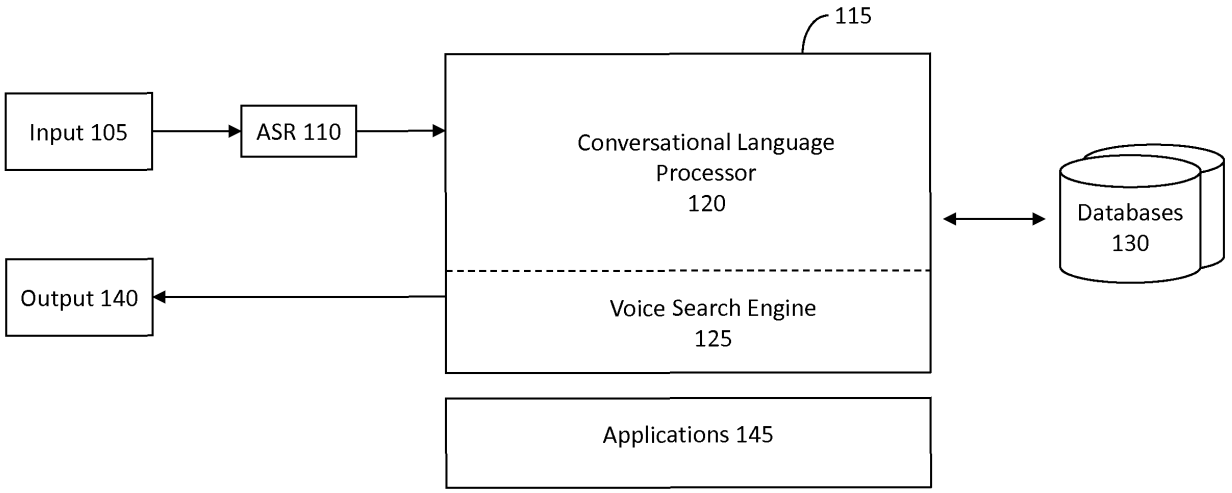

115
Input 105
ASR 110
Conversational Language Processor 120
Databases 130
Output 140
Voice Search Engine 125
Applications 145

Figure 1

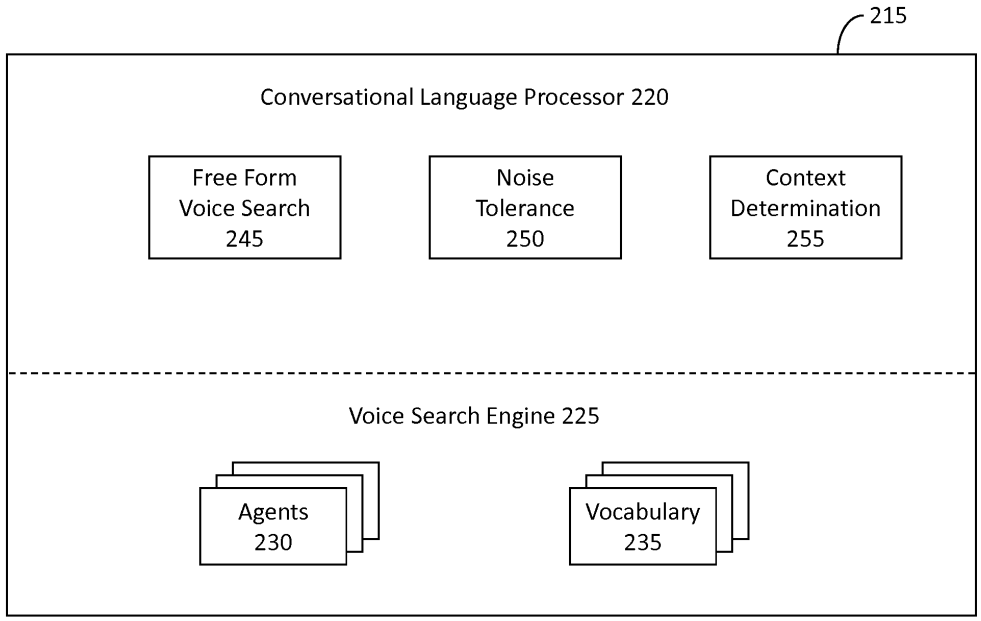

215
Conversational Language Processor 220
Free Form Voice Search 245
Noise Tolerance 250
Context Determination 255
Voice Search Engine 225
Agents 230
Vocabulary 235

Figure 2

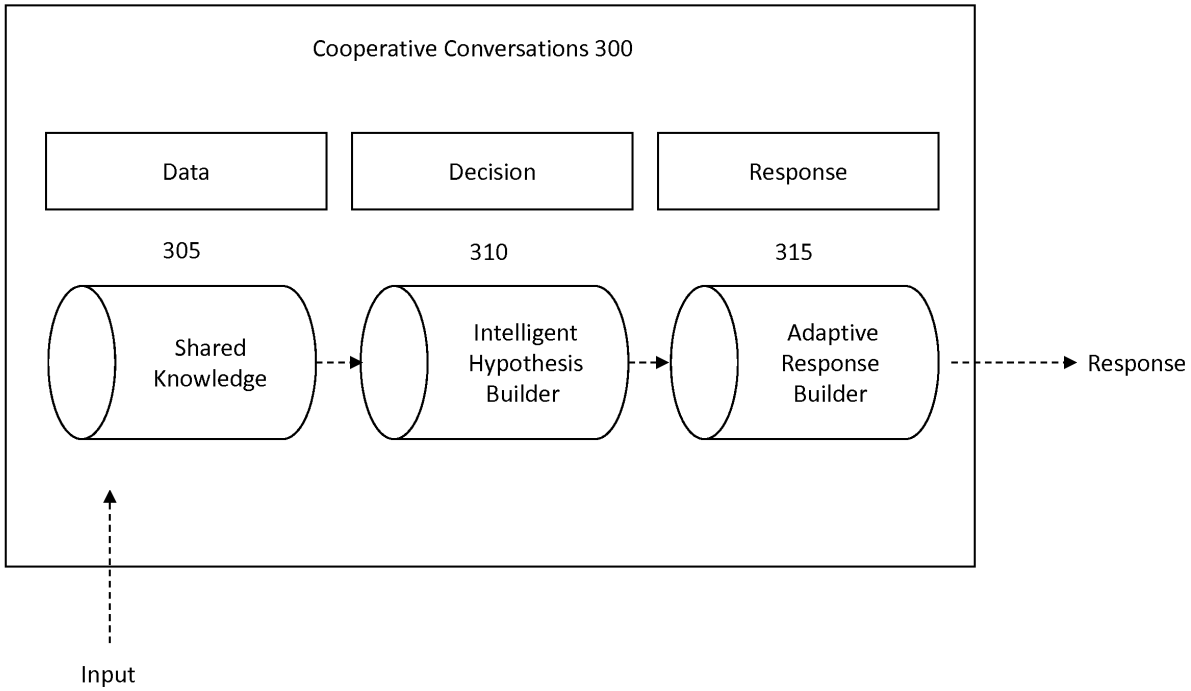

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310
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Shared Knowledge
Intelligent Hypothesis Builder
Adaptive Response Builder
Response
Input

Figure 3

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE
First Named Inventor/Applicant Name:	Larry BALDWIN
Filer:	Ngai Bing Zhang/Monet Noel
Attorney Docket Number:	090611-0438199

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**730**

Electronic Acknowledgement Receipt

EFS ID:	22115691
Application Number:	14691445
International Application Number:	
Confirmation Number:	8351
Title of Invention:	SYSTEM AND METHOD FOR A COOPERATIVE CONVERSATIONAL VOICE USER INTERFACE
First Named Inventor/Applicant Name:	Larry BALDWIN
Customer Number:	909
Filer:	Ngai Bing Zhang/Monet Noel
Filer Authorized By:	Ngai Bing Zhang
Attorney Docket Number:	090611-0438199
Receipt Date:	20-APR-2015
Filing Date:	
Time Stamp:	19:31:05
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	0438199_TRANS.pdf	648569 f452058d71c189d016827148db3648c955de2c56	no	3
Warnings:					
Information:					
2	Application Data Sheet	0438199_ADS.pdf	1566524 776cc37d4aa5eeff38b6c02e77af352d1288de56	no	8
Warnings:					
Information:					
3	Oath or Declaration filed	0438199_DEC.pdf	4716889 a0b2e64a686a724e73d0ad1010e74d0a2abfa69c	no	5
Warnings:					
Information:					
4	Assignee showing of ownership per 37 CFR 3.73	0438199_AssignmentfromParent.pdf	80964 b7fca30191620d3d39f97d53e178fe575b123de6	no	3
Warnings:					
Information:					
5	Power of Attorney	0438199_POA.pdf	1816932 6402d99cdb5586bf4e8b1374ca37632d74b9954c	no	1
Warnings:					
Information:					
6	Assignee showing of ownership per 37 CFR 3.73	0438199_373c.pdf	528196 9cf9eb172b873ddabe1d08b8de7fb1836a0f7c72	no	2
Warnings:					
Information:					
7	Transmittal Letter	0438199_IDS.pdf	506534 c73796394abd3a6ee523667a385cf636109f8877	no	2
Warnings:					
Information:					

8	Information Disclosure Statement (IDS) Form (SB08)	0438199_1449.pdf	691451 fc0e4a00450fb9d7f97b69652d6819613dc9f6c5	no	29
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Information:					
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	Multipart Description/PDF files in .zip description				
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	Specification		1	31	
	Claims		32	37	
	Abstract		38	38	
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10	Drawings-only black and white line drawings	0438199_FIGS3.pdf	468102 85f152ed3306b6e0920dce0371960485074e9125	no	3
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Information:					
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