(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
01 November 2018 (01.11.2018)

WIPO | PCT

(10) International Publication Number
WO 2018/200295 A1

(51) International Patent Classification:
G06Q 30/06 (2012.01) *G06Q 30/00* (2012.01)

(21) International Application Number:
PCT/US2018/028222

(22) International Filing Date:
19 April 2018 (19.04.2018)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
201710297116.X 28 April 2017 (28.04.2017) CN

(71) Applicant: **MICROSOFT TECHNOLOGY LICENSING, LLC** [US/US]; One Microsoft Way, Redmond, Washington 98052-6399 (US).

(72) Inventors: **CUI, Lei**; MICROSOFT TECHNOLOGY LICENSING, LLC, One Microsoft Way, Redmond, Washington 98052-6399 (US). **HUANG, Shaohan**; MICROSOFT TECHNOLOGY LICENSING, LLC, One Microsoft Way, Redmond, Washington 98052-6399 (US). **WEI, Furu**; MICROSOFT TECHNOLOGY LICENSING, LLC, One Microsoft Way, Redmond, Washington 98052-6399 (US). **ZHOU, Ming**; MICROSOFT TECHNOLOGY LICENSING, LLC, One Microsoft Way, Redmond, Washington 98052-6399 (US). **TAN, Chuanqi**; MICROSOFT TECHNOLOGY LICENSING, LLC, One Microsoft Way, Redmond, Washington 98052-6399 (US). **DUAN, Chaoqun**; MICROSOFT TECHNOLOGY LICENSING, LLC, One Microsoft Way, Redmond, Washington 98052-6399 (US).

(74) Agent: **MINHAS, Sandip S.** et al.; MICROSOFT TECHNOLOGY LICENSING, LLC, One Microsoft Way, Redmond, Washington 98052-6399 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,

(54) Title: CHAT CONVERSATION BASED ON KNOWLEDGE BASE SPECIFIC TO OBJECT

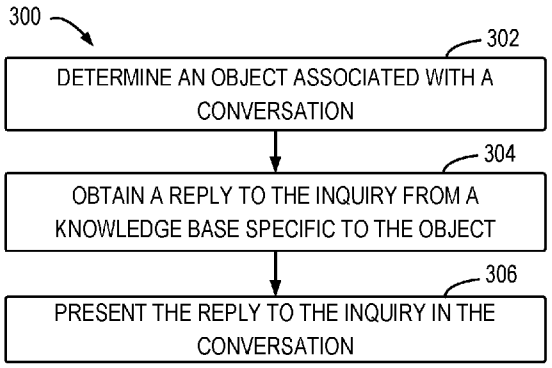


FIG. 3

(57) Abstract: In the implementations of the present disclosure, a method and device for implementing a chat conversation based on a knowledge base specific to an object are provided. After receiving a conversation request initiated by a user, the object involved in the conversation is determined, and a reply to an inquiry of the user is provided by use of the knowledge base specific to the object. According to the implementations of the present disclosure, information specific to the object is used to reply the user inquiry related to the object, thereby enabling reply the user inquiry related to the particular object accurately and effectively. Thus, implementations of the present disclosure can not only improve the efficiency of replying the user inquiry but also can improve the user experience.

WO 2018/200295 A1

[Continued on next page]

SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

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

CHAT CONVERSATION BASED ON KNOWLEDGE BASE SPECIFIC TO OBJECT

BACKGROUND

[0001] Chatbot is a computer program to simulate human chat or conversation, and it can utilize pre-built data to make an intelligent conversion with the user. Chatbot is generally integrated in a conversation system as an intelligent online helper and used in the fields of intelligent chat, customer service, information acquisition and so on. For example, a website may use a chatbot to reply some of the user inquiries automatically.

[0002] Conventionally, the chatbot is configured to reply a message based on a predefined conversion. For example, when the user inputs a message, the chatbot returns a response or reply for the message. To this end, the chatbot should store a set of preset query-response pairs in advance. When the chatbot receives a message from the user, it matches the message with all the queries in the predefined query-response set and selects a reply corresponding to the most matching query as a reply to the user message.

SUMMARY

[0003] The inventors realize that although chatbot has been widely used in many fields, its intelligence level falls short of the needs of the users in many cases, because it can reply the user messages based only on some pre-constructed conversions. For example, the e-commercial websites usually employ service staff to reply some user inquiries. Different from the traditional chatbot, the present disclosure utilizes a knowledge base specific to an object to reply a user inquiry related to a object. As the knowledge base contains information specific to the object, an accurate and effective reply can be provided for user inquiries related to the specific object, which distinguishes the present disclosure from any known schemes in terms of working principle and mechanism.

[0004] In the implementations of the present disclosure, there is provided a method and device for implementing a chat conversation based on a knowledge base specific to an object. After a conversation request initiated by the user is received, the object involved in the conversation is determined and a knowledge base specific to the object is utilized to reply the user inquiry. According to the implementations of the present disclosure, information specific to an object is used to reply a user inquiry related to the object so that an accurate and effective reply can be made to the user inquiry related to the specific object. Therefore, the implementations of the present disclosure can not only improve the efficiency of replying the user inquiry but also can enhance the user experience.

[0005] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] With reference to the drawings and the detailed description below, the above and other features, aspects, and advantages of the implementations of the disclosure will become more apparent. Throughout the drawings, the same or similar reference symbols are used to indicate the same or similar elements, in which:

[0007] FIG. 1 shows a block diagram of a computing system/server in which one or more implementations of the present disclosure may be implemented;

[0008] FIG. 2 shows a schematic diagram of an example environment in which one or more implementations of the present disclosure may be implemented;

[0009] FIG. 3 shows a flowchart of a method for implementing a chat conversation based on a knowledge base specific to an object according to the implementations of the present disclosure;

[0010] FIG. 4 shows a schematic diagram of a computing system in which one or more implementations of the present disclosure may be implemented;

[0011] FIGS. 5A-5C show graphic user interfaces (GUIs) for chatting in a browser according to the implementations of the present disclosure;

[0012] FIG. 6 shows a schematic diagram of an example knowledge base according to the implementations of the present disclosure; and

[0013] FIGS. 7A-7B show graphic user interfaces (GUIs) for chatting in an application program according to the implementations of the present disclosure.

DETAILED DESCRIPTION

[0014] The implementations of the disclosure will be described in details with reference to the drawings. Although the drawings demonstrate some implementations of the disclosure, it is to be understood that the disclosure described herein may be implemented in various manners other than the ones described herein. To the contrary, these implementations are provided for a more thorough and comprehensive understanding of the disclosure. It should be understood that the drawings and implementations of the disclosure are only for the purpose of illustration, rather than suggesting any limitations on the scope of the subject matter.

[0015] As used herein, the term "include" and its variants are to be read as open terms that mean "include, but is not limited to." The term "based on" is to be read as "based at least in part on." The term "one implementation" and "an implementation" are to be read as "at least one implementation." The term "another implementation" is to be read as "at least one other implementation," and the term "some implementations" are to be read as "at least some implementations." Definitions related to other terms will be provided in the following description.

[0016] Conventionally, service staffs generally reply user inquires related to various objects (such as by use of phone or message application). However, different user inquiries might be repetitive, and it takes a large amount of human resources to reply repetitive inquires manually. Besides, as the user may raise inquires at any time, it is hardly possible for service staffs to provide instant service around the clock. Therefore, chat conversations based on service staffs are high in cost and low in efficiency.

[0017] One improvement made to the traditional service staffs is to use chatbot which replies user inquiries with pre-built human conversions. In this manner, replies can be made to some simple inquiries from the user. However, the traditional chatbot generally utilizes a large knowledge base to reply all the inquiries or questions, and thus it often fails to accurately generate a proper reply to present to the user. Furthermore, the knowledge base of the traditional chatbot is usually built in advance, and thus the number of inquiries for which replies can be given is limited. Thus, users still need to wait for the service staff to reply their inquires, which results in a poor user experience. As a result, the traditional chatbot cannot respond to user inquiries in a effective manner.

[0018] To this end, the implementations of the present disclosure provide a chat conversation based on a knowledge base specific to an object. Different from the traditional schemes of extracting knowledge from a universal knowledge base shared by a plurality of objects, implementations of the present disclosure identify a specific object involved in the current conversation and reply the user inquiry with a knowledge base specific to the object. In this manner, a reply can be given to user inquiry related to a specific object in a more specific, accurate and efficient manner. Therefore, the implementations of the present disclosure can not only improve the efficiency of replying the user inquiries but also enhance the user experience.

[0019] Furthermore, according to the implementations of the present disclosure, a knowledge base can be built based on product information and user-generated contents in a page, where the knowledge base may include attribute description, query-answer pairs and

customer reviews of the object so that the contents in the knowledge base are more comprehensive and accurate. By determining confidence of candidate replies, the implementations of the present disclosure can ensure the suitability of the replies efficiently. Meanwhile, when there are no suitable replies, the user inquiries are posted in the user inquiry area of the page so that a reply can be given to the inquiry finally. Furthermore, in a condition that the inquiry also involves another object, knowledge bases of the two objects may be utilized at the same time to generate the reply to the inquiry, thereby further enhancing the user experience.

[0020] Basic principles and multiple example implementations of the present disclosure are explained with reference to FIGS. 1-7. FIG. 1 shows a block diagram of a computing system/server 100 in which one or more implementations of the disclosure may be implemented. It should be understood that the computing system/server 100 shown in FIG. 1 is only an example and shall not limit the functionality and scope of the implementations described herein in any manner.

[0021] As shown in FIG. 1, the computing system/server 100 is in the form of general computer equipment. Components of the computing system/server 100 may include, but are not limited to, one or more processors or processing units 110, a memory 120, a storage 130, one or more communication units 140, one or more input devices 150 and one or more output devices 160. The processing unit 110 may be a physical or virtual processor capable of performing various processing based on the program stored in the memory 120. In a multiprocessor system, multiple processing units may execute the computer-executable instructions in parallel to improve the parallel processing capability of the computing system/server 100.

[0022] The computing system/server 100 usually includes a plurality of computer storage media, which may be any available media accessible by the computing system/server 100, including but not limited to volatile and non-volatile media and removable and non-removable media. The memory 120 may be a volatile memory (e.g., register, high-speed cache, random-access memory (RAM)), a non-volatile memory (e.g., read only memory (ROM), electrically erasable programmable read-only memory (EEPROM), flash) or a combination of the two. The storage 130, which may be removable or non-removable media, includes machine-readable media, such as flash memory drive, disk or any other media and can be used to store information and/or data (such as knowledge base 170 which includes a plurality of knowledge bases 175 each specific to a single object) and can be accessed in the computing system/server 100.

[0023] The computing system/server 100 can further include another removable/non-removable and volatile/non-volatile storage medium. Although not illustrated in FIG. 1, it can provide a disk drive for reading from or writing into the removable and non-volatile disk (such as "a floppy disk") and an optical disk drive for reading from or writing into the removable and non-volatile optical disk. In these cases, each drive can be connected to the bus (not shown) via one or more data media interfaces. The memory 120 can include a chat engine 125 which has one or more program module assemblies, where the program modules are configured to execute the method or functions of various implementations described herein.

[0024] The communication unit 140 communicates with another computing device through communication media. Additionally, the functions of the components in the computing system/server 100 may be realized by a single computing cluster or a plurality of computing machines, where computing machines communicate through communication connections. Therefore, the computing system/server 100 may be operated in the networked environment through a logic link with one or more other servers, a networked personal computer (PC) or a further network node.

[0025] The input device 150 may be one or more various input devices, such as a mouse, a keyboard and a trackball etc. The output device 160 may be one or more various output devices, such as a display, a loudspeaker and a printer and so on. The computing system/server 100 may further communicate, through the communication unit 140, with one or more external devices (not shown), such as a storage device, a display device and the like, with one or more devices that enable the interaction between a user and the computing system/server 100, or any device (e.g., a network card, a modem and the like) that enables the communication between the computing system/server 100 and one or more other computing devices. Such communication can be executed through an input/output (I/O) interface (not shown).

[0026] As shown in FIG. 1, the storage 130 stores the knowledge base 170 which includes a knowledge bases 175 specific to a single object. The computing system/server 100 can receive an inquiry 180 through the communication unit 140, such as a message "What is the screen size?" Next, the chat engine 125 can be used to process the received message 180 based on a knowledge base 175 specific to the single object and generate a reply 190, such as a message "the screen size is 5.15 inches." Example implementations of generating the reply 190 by the chat engine 125 based on the single knowledge base 175 will be described in detail below with reference to FIGS. 2-7.

[0027] FIG. 2 shows a schematic diagram of an example environment 200 in which one or more implementations of the present disclosure may be implemented. As shown in FIG. 2, the environment 200 includes a plurality of user devices 210_1, 210_2 and 210_n (collectively called as user device 210), where 210_1 for example is a laptop computer, 210_2 for example is a desktop computer, and 210_n for example is a mobile terminal. Actually, user device 210 may be any terminal device that has the networking capability, such as a mobile device (e.g. smart phone, tablet, portable computer) or a stationary device (e.g. desktop computer, Set Top Box (STB) and projector). Moreover, the environment 200 further includes a server 230 and a server 240, where the server 230 may be a website server providing a network module 235 and data while the server 240 may be a chat server providing a chat engine 125. It is to be understood that the server 240 may be the computing system/server 100 as illustrated in FIG. 1.

[0028] In some implementations, the user device 210, server 230 and server 240 may communicate with each other over network 220. The network 220 can be any wired and/or wireless network. Optionally, the network may include, but not limited to, the Internet, a wide area network, a metropolitan area network, a local area network, a virtual private network (VPN), a wireless communication network and so on. For example, when visiting the page provided by the server 230, the user device 210 may initiate a chat conversation with a chatbot provided by server 240. Further implementation details of the chat conversation between the server 240 and the user device 210 are described with reference to FIG. 4. Meanwhile, during the process that the user device 210 visits the page provide by the server 230, the server 240 may crawl information in the page browsed by the user device 210 from the server 230.

[0029] As shown in FIG. 2, the chat engine 125 may include an object determination module 242, a response generation module 244 and a response presentation module 246. The object determination module 242 is used to determine a object involved in the chat conversation automatically, the response generation module 244 is used to generate a reply to the user inquiry based on a knowledge base specific to an object, and the response presentation module 246 is used to display the reply in the chat conversation. These modules can be implemented by software, hardware, firmware or any combination thereof.

[0030] According to the implementations of the present disclosure, the knowledge base specific to the object stores information obtained for the object involved in the chat conversation. Such information, for example, may include information obtained from the page for the object on the server 230. For example, the object may be a product on a e-

commercial platform. The knowledge base may include product information, related queries and responses and customer reviews related to the product.

[0031] FIG. 3 shows a flowchart of a method 300 for implementing a chat conversation based on a knowledge base specific to an object according to the implementations of the present disclosure. It is to be understood that method 300 may be executed by the computing system/server 100 as illustrated with reference to FIG. 1 or the server 240 as illustrated with reference to FIG. 2. For the sake of convenience, some example implementations will be described with reference to the conversation in a e-commercial website as illustrated in FIGS. 5A-5C and FIG. 6.

[0032] At 302, in response to receiving a request for initiating a conversation, an object associated with the conversation is determined. In the implementations described herein, the object can be any target project, which can be, for example, a product, a commodity or a service and the like. Moreover, in the present disclosure, different parameters for the same product (such as a particular model number of a cell phone with a 2G RAM release and a 4G RAM release) may be considered as different objects. In some implementations, the objects, for instance, may be distinguished by product identification (ID), for example, each product ID in the e-commercial website may correspond to one object.

[0033] For example, in some implementations, when the user device 210 browses the product page via a browser or views the product description in an application program, the conversation request may be initiated by triggering the chat button in the page or the application program, such as opening a conversation window. Next, the object determination module 242 may determine an object associated with the conversation. In some implementations, the conversation window may be presented in association with the page, for example, displayed in the current page or in a new page, where the product described in the page is determined as the object. In other words, when the user is browsing a page for a certain object, if the user initiates a conversation request in the page, it is considered that the conversation involves the object described in the page. Moreover, to confirm the object to the user, the object determination module 242 may make a self-introduction in the conversation and display the self-introduction information of the object to the user. Additionally or alternatively, if the object determined by the object determination module 242 is false, the user may provide a feedback.

[0034] For example, references are made to FIGS. 5A-5C which show graphic user interfaces (GUIs) for chatting in a browser according to the implementations of the present disclosure. It is to be understood that FIGS. 5A-5C are only example presentations of the

present disclosure, without limiting the scope of protection of the present disclosure. FIG. 5A illustrates a GUI 500 for browsing a page in the browser according to the implementations of the present disclosure. As shown in FIG. 5A, GUI 500 presents an example e-commercial platform page which includes a URL input area 501, a page title area 502, a product image area 505, a product profile area 510, a product information area 515, a customer question area 520 and a customer review area 525. As shown in FIG. 5A, the number following the sign of "like" in the customer question area 520 and customer review area 525 shows the number of times for the reply or review to be given "like" by the users, which may be used as voting data recorded for this piece of information. It is to be understood that, for the sake of conciseness, GUI 500 does not display all the information of the product. As shown in FIG. 5A, GUI 500 further includes a button 530. By clicking this button, the user can initiate a conversation with the chatbot (such as chat engine 125) according to the present disclosure, and the object associated with the conversation is automatically determined as the cellphone of a particular model number, such as the BBB 9S cellphone (4GB+32GB, all modes) as described in FIG. 5A.

[0035] It is to be understood by those skilled in the art that, for any ongoing conversation, it must be initiated first. For example, assuming that the user inputs an inquiry directly in the initiated conversation, the conversation must be initiated previously. Therefore, although the action that initiates the conversation is not explicitly described in a certain actual scenario, for an ongoing conversation, the action that initiates the conversation is implied in that scenario.

[0036] Returning to FIG. 3, at 304, in response to receiving an inquiry during the conversation, a reply to the inquiry is received from a knowledge base specific to the object, where the knowledge base includes information specific to the object. For example, after the object determination module 242 determines the object, for the user inquiry during the conversation, the response generation module 244 generates a corresponding reply based on a knowledge base specific to the object. Optionally, in a case that the page for the object is browsed, a knowledge base may be built based on the contents in the page. Alternatively, the knowledge base for each object may be built in advance, and each knowledge bases is updated periodically or when the object is accessed.

[0037] Reference is made to FIG. 6 which shows a schematic diagram of an example knowledge base 600 according to the implementations of the present disclosure. As shown

in FIG. 6, the knowledge base 600 may include an attribute description table 610, an query-answer pair table 620 and a customer review table 630. For example, the knowledge base 600 may be built by obtaining contents from the page by use of a network crawler. It is to be understood that although the knowledge base 600 includes three different kinds of tables, the knowledge base 600 may include more or fewer tables. In an implementation, the knowledge base 600 is specific to a particular type of cellphone, and thus information stored in Tables 610-630 is all related to this type of cellphone.

[0038] Still referring to FIG. 6, the attribute description table 610 includes product information of the cellphone, which belongs to fact information of this cellphone. The attribute description table 610 includes a name field and an attribute description field, for example, the first item in the attribute description table 610 shows that the body color of the cellphone is white and the m^{th} item shows that the cellphone supports fingerprint recognition.

[0039] The query-answer pair table 620 includes user questions about the cellphone and the answers form service staffs. Since these answers come form the professional service staff of the electronic website, these responses are generally very accurate. The query-answer pair table 620 shows q items by example. For example, the subject matter of the second item (about the camera anti-shake function) is not involved in the attribute description. In other words, the query-answer pair table 620 may include some information that is not involved in the attribute description table 610.

[0040] The customer review table 630 includes customer reviews related to the cellphone. These reviews are made by purchasing customers, and them may reflect the use experience of the cellphone to some extent. However, as customer reviews are personal subjective opinions of the users, the confidence degree may not be as high as attribute description information and query-answer pairs. In some implementations, a statistic may be made to the opinions of the customer reviews to improve reliability of customer reviews. For example, if 80% of the customer reviews on the battery reveal that the battery is not good while only 20% of the customer reviews on the battery reveal that the battery is good, it is considered that the opinions of 80% people are more reliable. Therefore, the weight of customer reviews showing that the battery is good may be reduced so that they are less likely to be chosen as a reply to the user inquiry.

[0041] In some implementations, the query-answer pair table 620 and the customer review table 630 may further include a voting data (such as data on "like" provided by the users) field. If the number of "like" given to a query-answer pair or a customer review is

high, then the query-answer pair or the customer review will be set with a higher weight so that it is more likely to be chosen as a reply to the user inquiry.

[0042] Returning to FIG. 3, at 306, the reply to the inquiry is displayed in the conversation. For example, the response presentation module 246 may display the generated reply in the conversation, and then the user may continue to input a further inquiry or close the conversation window. Optionally, the response presentation module 246 may only present the most suitable reply in the conversation window. Alternatively, the response presentation module 246 may also display multiple replies at the same time for the user's reference.

[0043] For example, reference is made to FIG. 5B which shows a GUI 540 for chatting in the current window of the browser according to the implementations of the present disclosure. As shown in FIG. 5B, after the button 530 is clicked (namely, a conversation request is initiated), a chat window 550 pops up, which may be suspended on the involved page, where the chat window 550 includes a user chat content input box 552 and a sending button 554. After the chat conversation is initiated, the chatbot may firstly present confirmation information 561, namely, "Hello, I'm a chatbot. The product you are viewing now is BBB 9S cellphone (4GB+32GB, all modes). I'm ready to answer your questions." In other words, the chatbot first confirms the object that is being discussed to the user. Then, the user issues an inquiry 562. The chatbot obtains the corresponding reply 563 from a knowledge base specific to the product (such as information in the page) and presents it in the conversation.

[0044] Reference is made to FIG. 5C which illustrates a GUI 570 for chatting in a new window of the browser according to the implementations of the present disclosure. It differs from GUI 540 described in FIG. 5B in that after clicking the button 530, a conversation window 503 can pop out in a new page. As shown in FIG. 5C, GUI 570 includes a user chat content input box 572 and a sending button 574. The chatbot first presents a confirmation message 581. During the conversation, the user issues an inquiry 582 and the chatbot uses a attribute description in the knowledge base to generate a reply 583. For an inquiry 584 issued by the user, the chatbot uses an query-answer pair in the knowledge base to generate a reply 585. For the inquiry 586 issued by the user, the chatbot uses a customer review in the knowledge base to generate a reply 587. After all the inquires of the user are solved, the user issues a chat message 588 and the chatbot uses the chit-chat content in a chat database to generate a reply 589.

[0045] Conventionally, the chatbot in e-commerce can reply some simple inquires or chat messages of the user only through a whole knowledge base, and replies to the inquires related to the product are usually made by the service staffs. By use of method 300 according to the subject matter described in the present disclosure, replies can be made to user inquiries related to the object by use of information specific to the object, thereby replying the user inquiries related to the specific object in an efficient manner. Therefore, the implementations of the present disclosure can not only improve efficiency of replying user inquiries but also can enhance the user experience.

[0046] According to the implementations of the present disclosure, although the chatbot can make a reply to the most of the user inquiries, there still exist some cases where suitable responses for the queries cannot be found or no reply can be found for the queries. Therefore, in some implementations, the confidence of the most relevant candidate reply obtained from the knowledge base can be determined, and the confidence represents the reliability of the candidate reply. For example, the confidence may be determined based on the relevancy between the inquiry and the candidate reply. The higher the relevancy is, the higher the confidence is. If the confidence is higher than a predetermined threshold (which may be determined through statistics or be specified manually), it means that the candidate reply is reliable enough to be selected as a formal reply.

[0047] If the confidence is smaller than the predetermined threshold, it means that the candidate reply is unreliable and not suitable to be output as a formal reply. Therefore, to prevent unsuitable replies from misleading the user, chit-chat content can be obtained from the chat database as a reply to the inquiry. For example, if the user asks a parameter that is not recorded in a knowledge base, chit-chat content like "Sorry, I'm not clear either" may be used to reply the inquiry. Next, to find a reply to the user inquiry, the inquiry may be posted in the user inquiry area in the page to be further replies by a service staff of the website. Optionally, the inquiry posted in the user inquiry area may be tracked. When a reply is made to the inquiry, the reply can be sent to the user via an e-mail or a SMS message.

[0048] In some implementations, the knowledge base may include attribute description (information related to parameters of the object), query-answer pairs (questions and answers for the object) and customer reviews (customer reviews on the object) specific to the object. When an inquiry is received during the conversation, a reply may be generated based on attribute description, query-answer pairs and customer reviews in the knowledge base. The reply may come from one or more of the attribute description, query-answer pairs and customer reviews.

[0049] In some implementations, the user intention of the inquiry may be determined, and then a reply may be obtained from the corresponding information type based on the user intention. For example, assuming that the user inquiry is "How is user experience of this model of cellphone?" it can be determined that the user intention is to learn about user experience of other purchasers, and thus it is suitable to obtain a reply to this inquiry from customer reviews in the knowledge base. Therefore, by determining the user intention, information to be queried may be filtered, thereby improving response speed of the chat engine.

[0050] In some implementations, during the process of constructing the knowledge base, each information record may be configured with a weight so that information with higher weight is more likely to be selected as a reply. For example, the weight can be based on the voting data of uses in information records (such as data of user's "like"). Generally, the more "like" is given to an query-answer pair or a customer review, the more reliable the query-answer pair or the customer review will be, hence it is more suitable to be output as a reply.

[0051] In some implementations, during the process of a chat conversation for an object, the user may involve another object. Another knowledge base specific to the other object may be built in real-time or obtained from the database, where another knowledge base specific to another object is different from the knowledge base specific to the object. Next, a response specific to the inquiry may be obtained from both one knowledge base and another knowledge base.

[0052] FIG. 4 shows a schematic diagram of a computing system 400 in which one or more implementations of the present disclosure may be implemented. As shown in FIG. 4, the computing system 400 includes a chat engine 125, and the chat engine 125 includes four sub-engines, namely, a attribute query engine 410, a reply query engine 420, a review query engine 430 and a chit chat engine 440. In the implementations of the present disclosure, the term "engine" denotes a functional component that can achieve the corresponding function, which can be implemented by software (such as module or program), hardware, firmware or any combination thereof.

[0053] As shown in FIG. 4, the computing system 400 further includes a user device 450, a network crawler 460, a knowledge base 470 specific to an object and a chat database 480. It is to be understood that the user device 450 shown in FIG. 4 may be used as the user device 210 as described with reference to FIG. 2, and the attribute query engine 410, the reply query engine 420, the review query engine 430 and the chat engine 440, the network

crawler 460, the knowledge base 470 specific to the object and the chat database 480 in FIG. 4 may be included in the server 240 as described with reference to FIG. 2.

[0054] For example, when the user device initiates a conversation request or browses a page, the involved object may be determined automatically 452. Then, the network crawler 460 crawls information related to the object, and attribute description, query-answer pairs and customer reviews of the object are stored 465 in the knowledge base 470 specific to the object. During the conversation, when the user device 450 sends 454 an inquiry, the attribute query engine 410, the reply query engine 420 and the review query engine 430 are executing in parallel or sequentially in the chat engine to process the inquiry, and information specific to the object is obtained 475 from the knowledge base 470 specific to the object. If no suitable reply is obtained from the knowledge base 470 specific to the object, then the chit chat engine 440 may be used to obtain chit-chat content from the chat database 480 as a reply. Then, the chat engine 125 displays 456 a reply to the user device 450.

[0055] According to the implementations of the present disclosure, as the network crawler 460 can determine the involved object automatically during the process of initiating a conversation request or browsing the page, and crawl message inside the page in real time, it is not necessary to deploy network crawlers to the whole website. Furthermore, the crawled message may be stored in the knowledge base, and contents in the knowledge base is updated during the next accessing.

[0056] In some implementations, the attribute query engine 410 is used to reply fact information related to the object, such as the screen size of the cellphone. The attribute description table 610 as illustrated with reference to FIG. 6 describes an example data structure of the attribute description information. For example, for the user inquiry, the inquiry may be matched semantically with the attribute name, and a reply is made with the most relevant attribute name and its attribute description based on a template. For example, the example template for generating attribute description may be: (attribute name) is (attribute description), or (attribute name) of (object) is (attribute description), where the contents inside the bracket are variables.

[0057] In some implementations, the reply query engine 420 is used to match the existing questions and use the answer to an existing question as a reply to the user inquiry. The query-answer pair table 620 as illustrated with reference to FIG. 6 describes an example data structure of the inquiry and response information. For the user inquiry, the inquiry may be matched semantically with existing questions and then the answer corresponding to

the most relevant question is used as a reply to the user inquiry. Since semantic matching is used, inquiries like "What pixels do the front and back cameras have, respectively?" and "What are the front and back pixels" may be determined to be highly relevant.

[0058] In some implementations, the review query engine 430 is used to match the customer reviews and use the customer review as a reply to user inquiry. The customer review table 630 as illustrated in FIG. 6 describes example data structure of customer review information. The customer reviews provide personal opinions related to the object from the user's perspective and constitute important resources for replying opinion-oriented inquires. The crawled customer reviews may be analyzed and decomposed, and description and the corresponding opinions in the customer reviews may be extracted. In some implementations, a statistic may be made to user's opinions in all the reviews to generate a synthesized reply. In some implementations, the user inquiries and customer reviews may be matched, and a plurality of candidate customer reviews may be ranked with a regression-based framework. When a candidate customer review meets a predefined confidence condition, it may be output as a reply to the inquiry.

[0059] In some implementations, the chit chat engine 440 is used to reply the user with the chit chat data in the chat database 480, for example, replying some greeting messages of the user, such as "Hello," "Thank you." Moreover, when the chat engine 125 cannot reply the user inquiry, to prevent unsuitable reply from misleading the user, chit-chat content may be acquired from the chat database 480 as a reply to the inquiry. For example, the chat engine 125 may tell the user that no reply can be found for the inquiry for the moment, and prompt the user to obtain a reply from the service staff or by other means.

[0060] The chat engine 125 may execute four sub-engines in parallel or sequentially and combine or pick out replies from different sub-engines. For example, the attribute query engine 410, reply query engine 420 and review query engine 430 provide a candidate reply to the chat engine 125 only when the candidate reply meets the predefined confidence. When none of the attribute query engine 410, reply query engine 420 and review query engine 430 obtains a candidate reply, the chit chat engine 440 may be used to reply user inquiry or message.

[0061] In some implementations, the chat engine according to the present disclosure may be used as an add-on extension of the browser and inserted in the browser. When the user browses a page, the add-on extension of the browser may determine the object browsed by the user automatically and crawl relevant contents in the page for the object. Those skilled in the art should appreciate that the chat engine according to the present disclosure can be

deployed as a first party or third party. When deployed as a first party, the chat engine is provided by the website or application program that provides the contents of the object. The chat engine may obtain structured data directly from the database of the website or application program, thereby improving customer service quality and reducing customer service costs. For example, the bank may deploy the chat engine according to the present disclosure on its website to provide customer service related to the bank business. Furthermore, when deployed as the third party, the chat engine according to the present disclosure may be deployed to any website, as open information in the page is used to reply the user inquiry, thereby enhancing the user experience effectively.

[0062] Therefore, according to the implementations of the present disclosure, for the user inquiry related the object, information specific to the object is used to make a reply, thereby improving accuracy and efficiency of the reply. Furthermore, information source of the response is enriched by obtaining attribute description, query-answer pairs and customer reviews specific to the product so that a response can be made to varied inquiries, and thus user experience can be enhanced.

[0063] FIGS. 7A-7B show graphic user interfaces (GUIs) for chatting in an application program according to the implementations of the present disclosure. It is to be understood that FIGS. 7A-7B are only used as example representations of the implementations of the present disclosure, without limiting the scope of protection of the present disclosure.

[0064] FIG. 7A illustrates a GUI 700 for browsing content in an application program according to the implementations of the present disclosure. As shown in FIG. 7A, GUI 700 displays an example page of the e-commercial application program which includes a product menu 701, a product information menu 702, a customer question menu 703 and a customer review menu 704. GUI 700 shows the current contents in the product menu 701 which include a product image area 710 and a product profile area 715 related the product "BBB 9S cellphone (4GB+32GB, all mode)". It is to be understood that when the product information menu 702, the customer question menu 703 and the customer review menu 704 are selected, product information, customer questions or customer reviews may be displayed.

[0065] As shown in FIG. 7A, GUI 700 further includes a chat button 720, a follow button 725 and a shopping button 730. A chat with the chatbot may be initiated by clicking the chat button 720, the product may be followed by clicking the focus button 725 and the product may be added to the shopping cart by clicking the shopping button 730. In some implementations, when the chat button 720 is clicked, it is possible to skip to a chat window in the current application program, for instance, the window as described in FIG. 7B.

Alternatively, when the chat button 720 is clicked, it is also possible to skip to another application program (such as an instant message application). In this case, the current application program sends the product ID of the product to the instant message application program, and then the user may perform a chat conversation related to the product with the chatbot in the instant message application.

[0066] FIG. 7B shows a GUI 750 for chatting in an application program according to the implementations of the present disclosure, which includes a user chat content input box 752 and a sending button 754. Similarly, the chatbot may display confirmation message 761 in the conversation window, such as "Hello, I'm a chatbot. The product you are viewing now is BBB 9S cellphone (4GB+32GB, all modes). I'm ready to answer your questions." Then, the user inputs chat message 762 and the chatbot makes a reply by use of chit-chat contents in the chat database. When the user inputs an inquiry 764 related to the product, the chatbot presents a reply 765 by use of information specific to the product. In some implementations, the user's inquiry may further involve another product, for example, CCC Q8 cellphone involved in inquiry 766, then the chatbot constructs or obtains a knowledge base specific to the CCC Q8 cellphone. A reply to the user inquiry with two knowledge bases specific to the two products in association, for example, generating a reply 767, which does not only include attribute description of one product but also attribute description of another product. Furthermore, for the user inquiry, the chatbot compares the battery capacity parameters of the two products and draws the conclusion that "More or less the same," thereby further enhancing the user experience.

[0067] The method and functionality described herein may be at least partly executed by one or more hardware logic components. For example, the example types of the usable hardware logic components may comprise, but are not limited to, Field Programmable Gate Array (FPGA), Application Specific Integrated Circuit (ASIC), Application Specific Standard Product (ASSP), System on Chip (SOC) and Complex Programmable Logic Device (CPLD).

[0068] Program codes for carrying out the methods of the disclosure may be written in any combination of one or more programming languages. These program codes may be provided to a processor or a controller of a general purpose computer, a special purpose computer, or other programmable data processing apparatus, such that the program codes, when executed by the processor or the controller, cause the functions/operations specified in the flowcharts and/or block diagrams to be implemented. The program codes may execute entirely on a computer, partly on the computer, as a stand-alone software package,

partly on the machine and partly on a remote computer or entirely on the remote computer or server.

[0069] In the context of the disclosure, a machine readable medium may be any tangible medium that can contain, or store a program for use by or in connection with an instruction execution system, apparatus, or device. The machine readable medium may be a machine readable signal medium or a machine readable storage medium. The machine readable medium may include, but are not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, or device, or any suitable combination thereof. More specific examples of the machine readable storage medium would include an electrical connection via one or more wires, a portable computer diskette, a hard disk, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or Flash memory), an optical fiber, a portable compact disc read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any suitable combination thereof.

[0070] Further, although the operations are depicted in a particular order, this should not be understood as requiring such operations to be performed in the particular order shown or in sequential order, or requiring all of the illustrated operations to be performed so as to achieve desirable results. In certain circumstances, multitasking and parallel processing may be advantageous. Likewise, while several specific implementation details are contained in the above discussions, these should not be construed as limitations on the scope of any disclosure. Certain features that are described in this specification in the context of separate implementations can also be implemented in combination in a single implementation. Conversely, various features that are described in the context of a single implementation can also be implemented in multiple implementations separately or in any suitable sub-combination.

[0071] Some example implementations of the disclosure are listed below.

[0072] In an aspect, there is provided an electronic device. The electronic device includes a processing unit and a memory coupled to the processing unit and having instructions stored thereon which, when executed by the processing unit, cause the device to perform acts including: in response to receiving a request for initiating a conversation, determining an object associated with the conversation; in response to receiving an inquiry during the conversation, obtaining a reply to the inquiry from a knowledge base specific to the object, wherein the knowledge base includes information specific to the object; and presenting the reply to the inquiry in the conversation.

[0073] In some implementations, the acts further comprise: during the process that a page for the object is browsed, constructing a knowledge base based on the contents in the page.

[0074] In some implementations, the conversation window is displayed in association with the page, and the determining an object associated with the conversation comprises: determining a product described in the page as the object.

[0075] In some implementations, the determining a product described in the page as the object comprises: presenting product information to user that inputs the inquiry in the conversation.

[0076] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object comprises: obtaining a candidate reply associated with the inquiry from the knowledge base; determining a confidence of the candidate reply based on the relevance between the inquiry and the candidate reply, wherein the confidence represents the reliability of the candidate reply; and in response to the confidence being above the predefined threshold, selecting the candidate reply as the reply.

[0077] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object further comprises: in response to the confidence being below the predefined threshold, obtaining chit-chat content from the chat database as a reply to the inquiry, wherein the chat database includes a set of pre-collected chat conversations; and posting the inquiry in a user inquiry area in the page.

[0078] In some implementations, the obtaining a candidate reply associated with the inquiry from the knowledge base further comprises: obtaining attribute description, a query-answer pair and a customer review that are associated with the inquiry and related to the object from the knowledge base; generating the candidate reply based on at least one of the obtained attribute description, query-answer pair and customer review.

[0079] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object comprises: determining a intention of a user that provides the inquiry in the conversation; determining information related to the intention from the knowledge base; and obtaining a reply to the inquiry from the determined information.

[0080] In some implementations, the constructing the knowledge base comprises: obtaining a query-answer pair involving the object from the page to be stored in the knowledge base; and setting a weight for the query-answer pair in the knowledge base based on voting data in the page.

[0081] In some implementations, the object is a first object and the knowledge base is a first knowledge base, and the acts further comprise: in response to the inquiry further

involving a second object different from the first object, determining a second knowledge base specific to the second object, wherein the second knowledge base is different from the first knowledge base; obtaining a reply to the inquiry from the first knowledge base and the second knowledge base.

[0082] In another aspect, there is provided a computer-implemented method. The method comprises: in response to receiving an inquiry for initiating a conversation, determining an object associated with the conversation; in response to receiving the inquiry during the conversation, obtaining a reply to the inquiry from a knowledge base specific to the object, wherein the knowledge base includes information specific to the object; and presenting the reply to the inquiry in the conversation.

[0083] In some implementations, the method further comprises: during the process that a page for the object is browsed, constructing a knowledge base based on the contents in the page.

[0084] In some implementations, the conversation window is displayed in association with the page, and the determining the object associated with the conversation comprises: determining a product described in the page as the object.

[0085] In some implementations, the determining a product described in the page as the object comprises: presenting product information to user that inputs the inquiry in the conversation.

[0086] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object comprises: obtaining a candidate reply associated with the inquiry from the knowledge base; determining a confidence of candidate reply based on the relevance between the inquiry and the candidate reply, wherein the confidence represents a reliability of the candidate reply; and in response to the confidence being above the predefined threshold, selecting the candidate reply as the reply.

[0087] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object further comprises: in response to the confidence being below the predefined threshold, obtaining chit-chat content from the chat database as a reply to the inquiry, wherein the chat database includes a set of pre-collected chat conversations; and posting the inquiry in a user inquiry area in the page.

[0088] In some implementations, the obtaining a candidate reply associated with the inquiry from the knowledge base further comprises: obtaining attribute description, a query-answer pair and a customer review that are associated with the inquiry and related to the

object from the knowledge base; generating candidate reply based on at least one of the obtained attribute description, query-answer pair and customer review.

[0089] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object comprises: determining a intention of a user that provides the inquiry in the conversation; determining information related to the intention from the knowledge base; and obtaining a reply to the inquiry from the determined information.

[0090] In some implementations, the constructing the knowledge base comprises: obtaining a query-answer pair involving the object from the page to be stored in the knowledge base; and setting a weight for the query-answer pair in the knowledge base based on voting data in the page.

[0091] In some implementations, the object is a first object and the knowledge base is a first knowledge base, the method further comprises: in response to the inquiry further involving a second object different from the first object, determining a second knowledge base specific to the second object, wherein the second knowledge base is different from the first knowledge base; obtaining a reply to the inquiry from the first knowledge base and the second knowledge base.

[0092] In another aspect, there is provided a computer program product tangibly stored on a non-transient machine-readable medium and comprising machine-executable instructions, the instructions which, when executed on a device, cause the device to: in response to receiving a request for initiating a conversation, determine an object associated with the conversation; in response to receiving the inquiry during the conversation, obtain a reply to the inquiry from a knowledge base specific to the object, wherein the knowledge base includes information specific to the object; and present the reply to the inquiry in the conversation.

[0093] In some implementations, the computer-executable instructions, when operated in the device, further cause the device to: construct a knowledge base based on the contents in the page for the object during the process that the page is browsed.

[0094] In some implementations, the conversation window is displayed in association with the page and determining the object associated with the conversation comprises: determining a product described in the page as the object.

[0095] In some implementations, the determining the product described in the page as an object comprises: presenting product information to user that inputs the inquiry in the conversation.

[0096] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object comprises: obtaining a candidate reply associated with the inquiry from the knowledge base; determining a confidence of candidate reply based on the relevance between the inquiry and the candidate reply, wherein the confidence represents a reliability of the candidate reply; and in response to the confidence being above the predefined threshold, selecting the candidate reply as the reply.

[0097] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object further comprises: in response to the confidence being below the predefined threshold, obtaining chit-chat content from a chat database as a reply to the inquiry, wherein the chat database includes a set of pre-collected chat conversations; and posting the inquiry in a user inquiry area in the page.

[0098] In some implementations, the obtaining a candidate reply associated with the inquiry from the knowledge base further comprises: obtaining attribute description, a query-answer pair and a customer review that are associated with the inquiry and related to the object from the knowledge base; generating the candidate reply based on at least one of the obtained attribute description, query-answer pair and customer review.

[0099] In some implementations, the obtaining a reply to the inquiry from a knowledge base specific to the object comprises: determining a intention of a user that provides the inquiry in the conversation; determining information related to the intention from the knowledge base; and obtaining a reply to the inquiry from the determined information.

[00100] In some implementations, the constructing the knowledge base comprises: obtaining a query-answer pair involving the object from the page to be stored in the knowledge base; and setting a weight for the query-answer pair in the knowledge base based on voting data in the page.

[00101] In some implementations, the object is a first object and the knowledge base is a first knowledge base, and the computer-executable instructions, when operated in the device, further cause the device to: in response to the inquiry further involving a second object different from the first object, determining a second knowledge base specific to the second object, wherein the second knowledge base is different from the first knowledge base; obtaining a reply to the inquiry from the first knowledge base and the second knowledge base.

[00102] Although the disclosure has been described with languages specific to structural characteristics and/or method logic actions, it should be appreciated that the subject matter defined by the attached claims is not limited to the above described particular characteristics

and actions. Conversely, the above described particular characteristics and actions are only example forms for implementing the claims.

CLAIMS

1. An electronic device, comprising:

a processing unit; and

a memory coupled to the processing unit and having instructions stored thereon which, when executed by the processing unit, cause the device to perform acts including:

in response to receiving a request for initiating a conversation, determining an object associated with the conversation;

in response to receiving an inquiry during the conversation, obtaining a reply to the inquiry from a knowledge base specific to the object, the knowledge base including information specific to the object; and

presenting the reply to the inquiry in the conversation.

2. The device according to claim 1, wherein the acts further include:

constructing the knowledge base based on content in a page for the object during a process that the page is browsed.

3. The device according to claim 2, wherein a window for the conversation is displayed in association with the page, and wherein the determining an object associated with the conversation comprises:

determining a product described in the page as the object.

4. The device according to claim 3, wherein the determining a product described in the page as the object comprises:

presenting, in the conversation, information of the product to a user that inputs the inquiry.

5. The device according to claim 2, wherein the obtaining a reply to the inquiry from a knowledge base specific to the object comprises:

obtaining a candidate reply associated with the inquiry from the knowledge base;

determining a confidence of the candidate reply based on relevance between the inquiry and the candidate reply, the confidence representing a reliability of the candidate reply; and

in response to the confidence being above a predefined threshold, selecting the candidate reply as the reply.

6. The device according to claim 5, wherein the obtaining a reply to the inquiry from a knowledge base specific to the object further comprises:

in response to the confidence being below the predefined threshold, obtaining chit-chat content from a chat database as the reply to the inquiry, the chat database including a set of pre-collected chat conversations; and

posting the inquiry in a user inquiry area in the page.

7. The device according to claim 5, wherein the obtaining a candidate reply associated with the inquiry from the knowledge base further comprises:

obtaining, from the knowledge base, an attribute description, a query-answer pair, and a customer review that are associated with the inquiry and related to the object; and

generating the candidate reply based on at least one of the obtained attribute description, query-answer pair, and customer review.

8. The device according to claim 1, wherein the obtaining a reply to the inquiry from a knowledge base specific to the object comprises:

determining an intention of a user that provides the inquiry in the conversation;

determining, from the knowledge base, information related to the intention; and

obtaining the reply to the inquiry from the determined information.

9. The device according to claim 2, wherein the constructing the knowledge base comprises:

obtaining, from the page, a query-answer pair involving the object to be stored in the knowledge base; and

setting a weight for the query-answer pair in the knowledge base based on voting data in the page.

10. The device according to claim 1, wherein the object is a first object and the knowledge base is a first knowledge base, the acts further including:

in response to the inquiry further involving a second object different from the first object, determining a second knowledge base specific to the second object, the second knowledge base being different from the first knowledge base; and

obtaining the reply to the inquiry from the first knowledge base and the second knowledge base.

11. A computer-implemented method, comprising:

in response to receiving a request for initiating a conversation, determining an object associated with the conversation;

in response to receiving an inquiry during the conversation, obtaining a reply to the inquiry from a knowledge base specific to the object, the knowledge base including information specific to the object; and

presenting the reply to the inquiry in the conversation.

12. The method according to claim 11, further comprising:

constructing the knowledge base based on content in a page for the object during a process that the page is browsed.

13. The method according to claim 12, wherein the obtaining a reply to the inquiry from a knowledge base specific to the object comprises:

obtaining a candidate reply associated with the inquiry from the knowledge base;

determining a confidence of the candidate reply based on relevance between the inquiry and the candidate reply, the confidence representing a reliability of the candidate reply; and

in response to the confidence being above a predefined threshold, selecting the candidate reply as the reply.

14. The method according to claim 13, wherein the obtaining a reply to the inquiry from a knowledge base specific to the object further comprises:

in response to the confidence being below the predefined threshold, obtaining chit-chat content from a chat database as the reply to the inquiry, the chat database including a set of pre-collected chat conversations; and

posting the inquiry in a user inquiry area in the page.

15. A computer program product stored on a non-transient computer storage medium and comprising machine-executable instructions which, when executed on a device, cause the device to:

in response to receiving a request for initiating a conversation, determine an object associated with the conversation;

in response to receiving the inquiry during the conversation, obtain a reply to the inquiry from a knowledge base specific to the object, the knowledge base including information specific to the object; and

present the reply to the inquiry in the conversation.

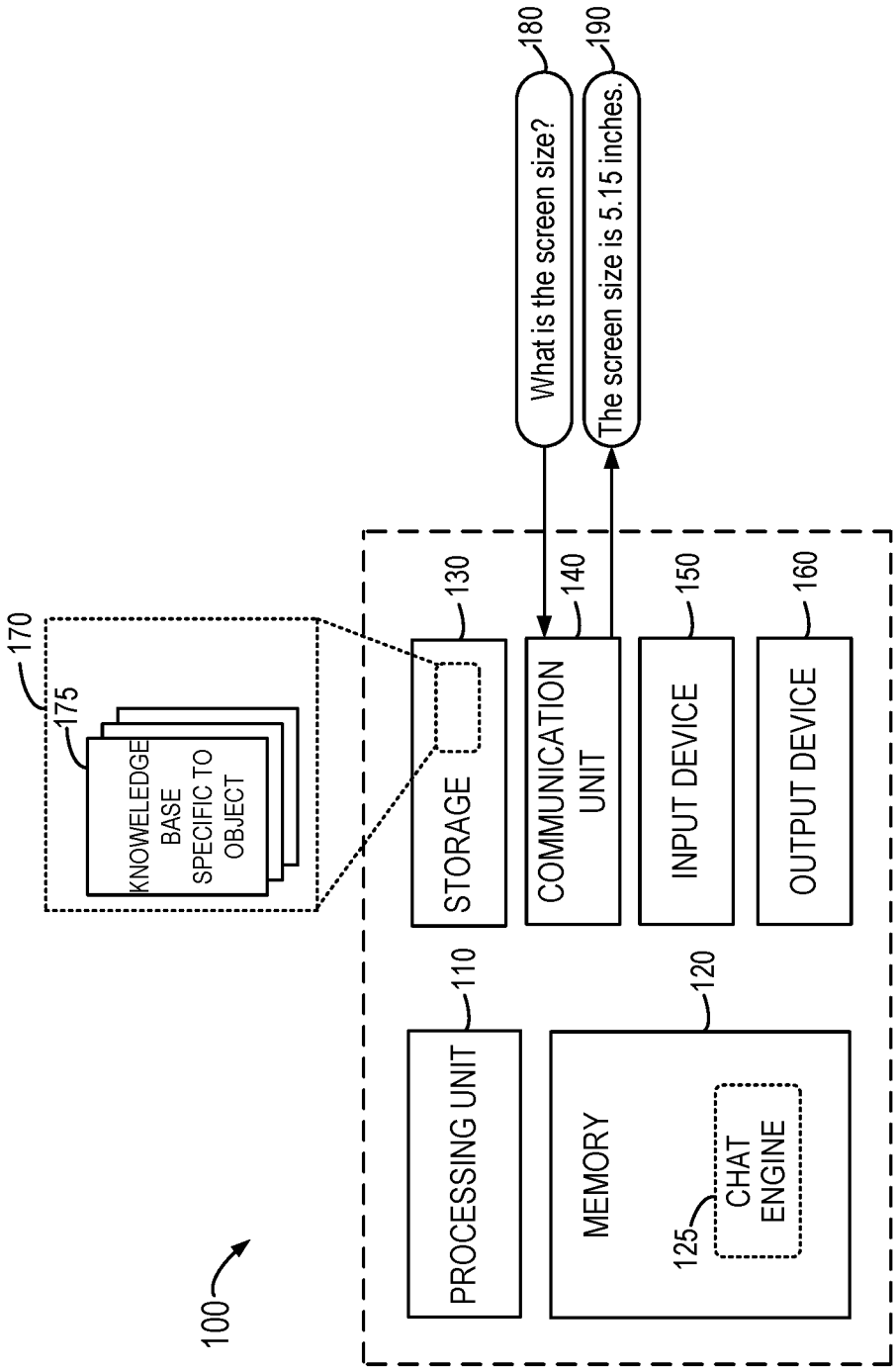

100
PROCESSING UNIT
110
MEMORY
120
CHAT ENGINE
125
STORAGE
130
COMMUNICATION UNIT
140
INPUT DEVICE
150
OUTPUT DEVICE
160
KNOWELEDGE BASE SPECIFIC TO OBJECT
175
170
What is the screen size?
180
The screen size is 5.15 inches.
190

FIG. 1

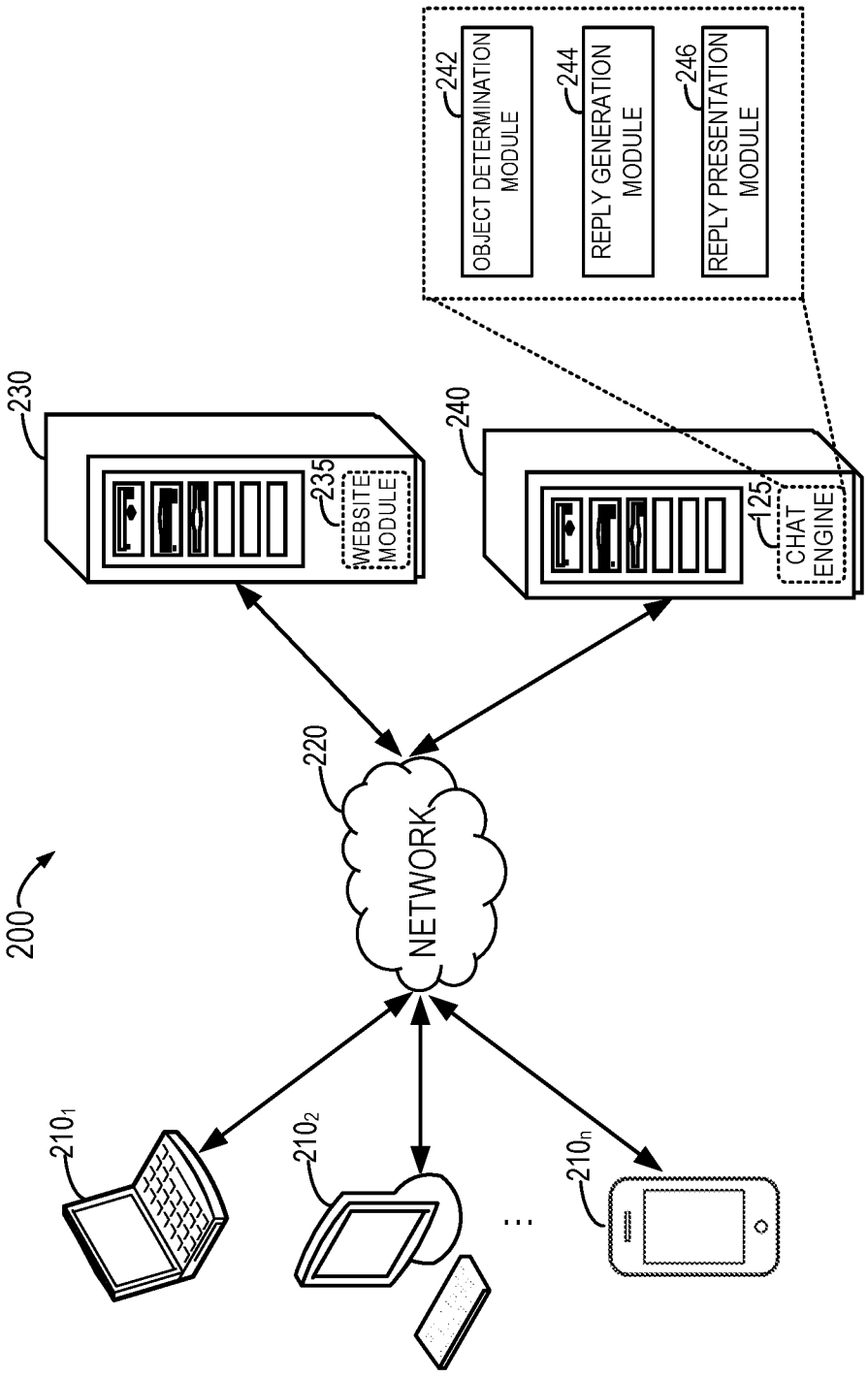

200
NETWORK
220
230
WEBSITE MODULE
235
240
CHAT ENGINE
125
OBJECT DETERMINATION MODULE
242
REPLY GENERATION MODULE
244
REPLY PRESENTATION MODULE
246
210_1
210_2
210_n

FIG. 2

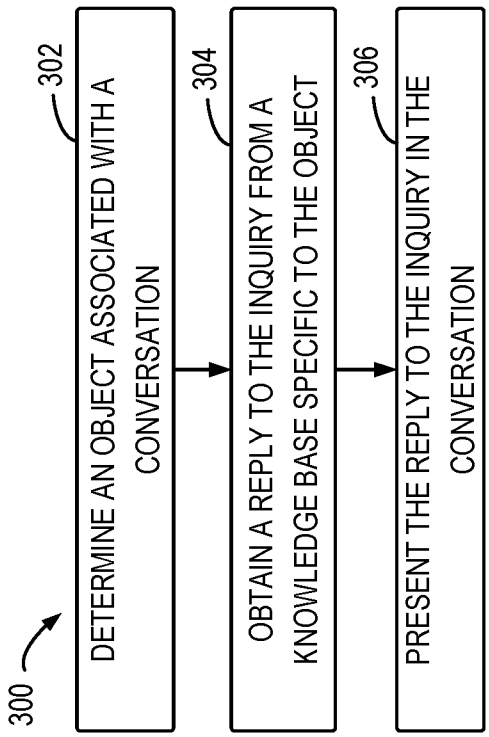

300
302
DETERMINE AN OBJECT ASSOCIATED WITH A CONVERSATION
304
OBTAIN A REPLY TO THE INQUIRY FROM A KNOWLEDGE BASE SPECIFIC TO THE OBJECT
306
PRESENT THE REPLY TO THE INQUIRY IN THE CONVERSATION

FIG. 3

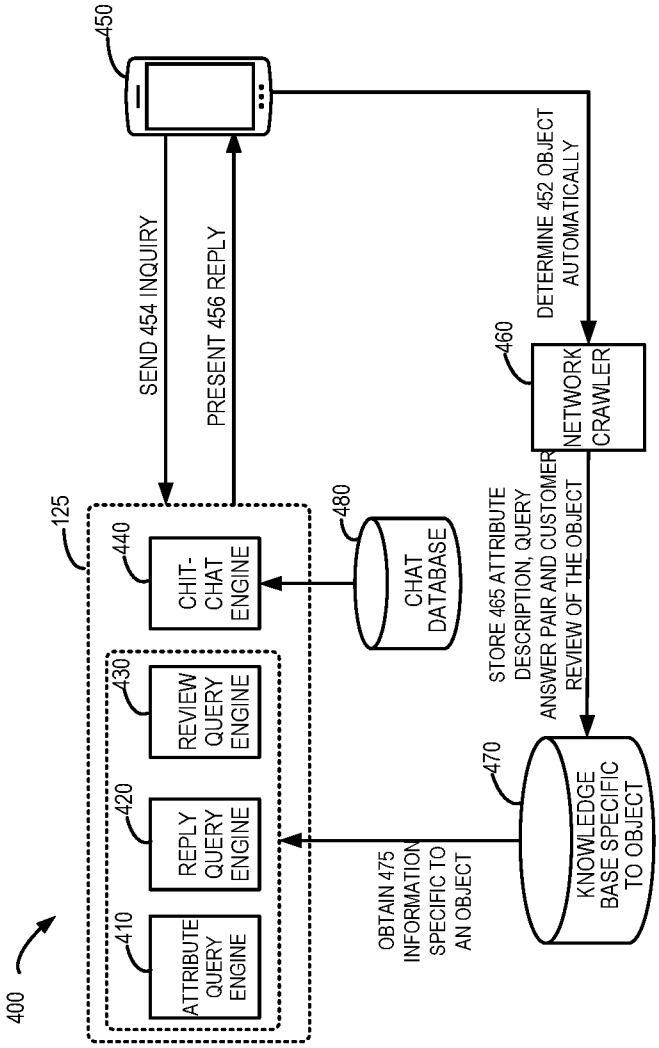

450
SEND 454 INQUIRY
PRESENT 456 REPLY
DETERMINE 452 OBJECT AUTOMATICALLY
460
NETWORK CRAWLER
125
440
CHIT-CHAT ENGINE
480
CHAT DATABASE
430
REVIEW QUERY ENGINE
420
REPLY QUERY ENGINE
410
ATTRIBUTE QUERY ENGINE
400
STORE 465 ATTRIBUTE DESCRIPTION, QUERY ANSWER PAIR AND CUSTOMER REVIEW OF THE OBJECT
470
KNOWLEDGE BASE SPECIFIC TO OBJECT
OBTAIN 475 INFORMATION SPECIFIC TO AN OBJECT

FIG. 4

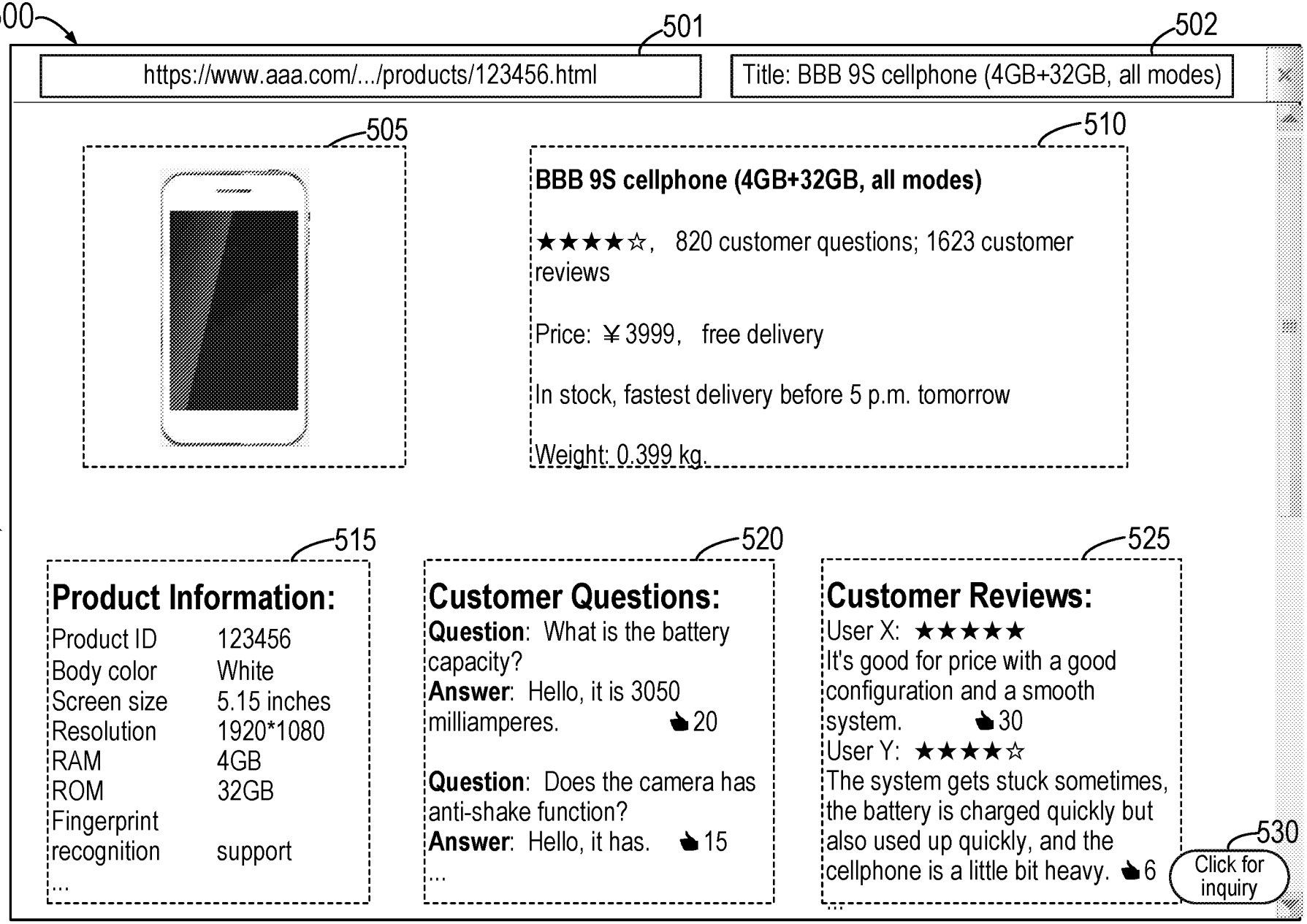

500
501
https://www.aaa.com/.../products/123456.html
502
Title: BBB 9S cellphone (4GB+32GB, all modes)
505
510
BBB 9S cellphone (4GB+32GB, all modes)
★★★★☆, 820 customer questions; 1623 customer reviews
Price: ¥3999, free delivery
In stock, fastest delivery before 5 p.m. tomorrow
Weight: 0.399 kg.
515
Product Information:
Product ID 123456
Body color White
Screen size 5.15 inches
Resolution 1920*1080
RAM 4GB
ROM 32GB
Fingerprint recognition support
...
520
Customer Questions:
Question: What is the battery capacity?
Answer: Hello, it is 3050 milliamperes. 20
Question: Does the camera has anti-shake function?
Answer: Hello, it has. 15
...
525
Customer Reviews:
User X: ★★★★★
It's good for price with a good configuration and a smooth system. 30
User Y: ★★★★☆
The system gets stuck sometimes, the battery is charged quickly but also used up quickly, and the cellphone is a little bit heavy. 6
...
530
Click for inquiry

FIG. 5A

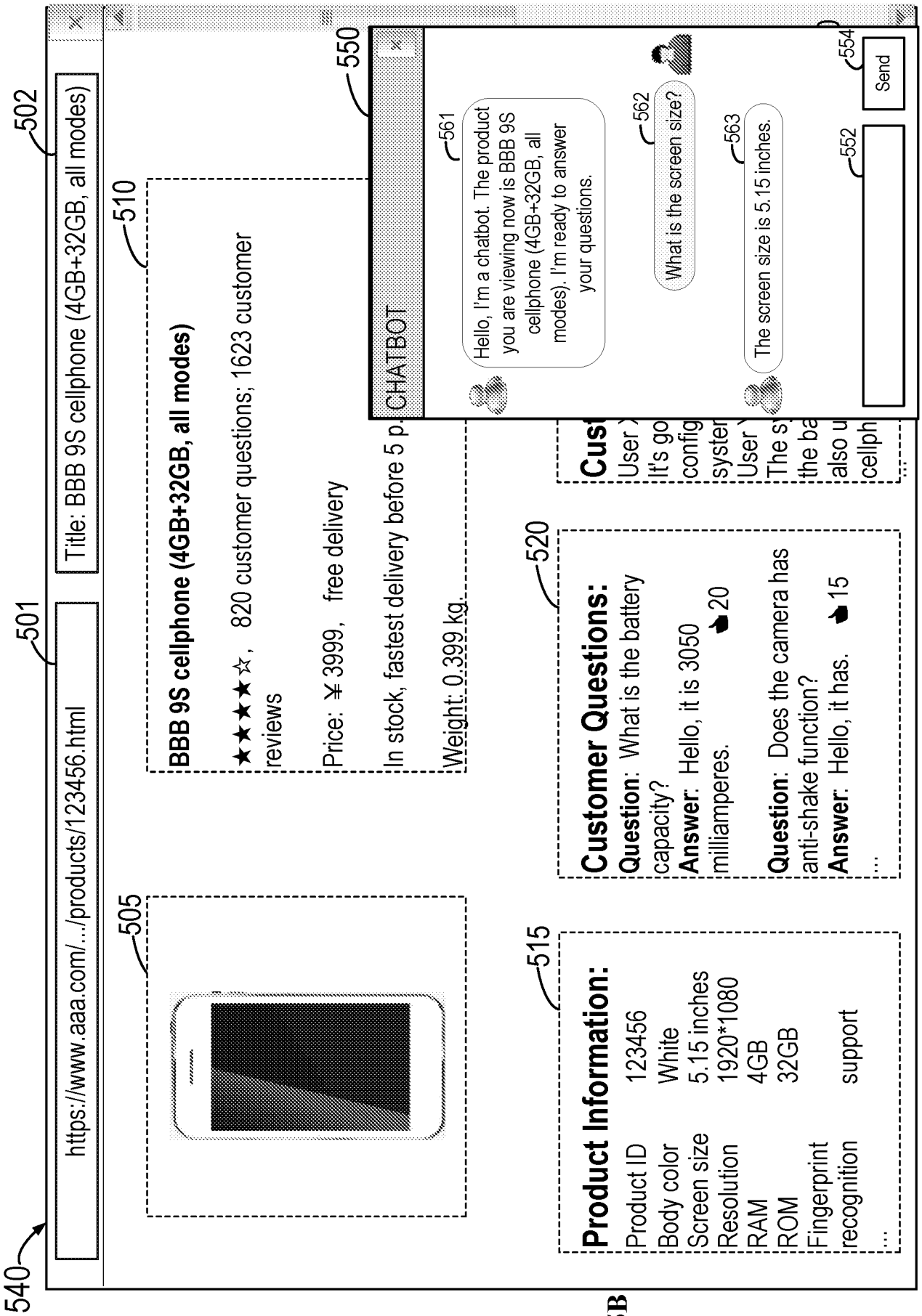

540
501
https://www.aaa.com/.../products/123456.html
502
Title: BBB 9S cellphone (4GB+32GB, all modes)
505
510
BBB 9S cellphone (4GB+32GB, all modes)
★★★★☆, 820 customer questions; 1623 customer reviews
Price: ¥ 3999, free delivery
In stock, fastest delivery before 5 p.
Weight: 0.399 kg.
515
Product Information:
Product ID 123456
Body color White
Screen size 5.15 inches
Resolution 1920*1080
RAM 4GB
ROM 32GB
Fingerprint recognition support
...
520
Customer Questions:
Question: What is the battery capacity?
Answer: Hello, it is 3050 milliamperes. 20
Question: Does the camera has anti-shake function?
Answer: Hello, it has. 15
...
550
CHATBOT
561
Hello, I'm a chatbot. The product you are viewing now is BBB 9S cellphone (4GB+32GB, all modes). I'm ready to answer your questions.
562
What is the screen size?
563
The screen size is 5.15 inches.
552
554
Send

FIG. 5B

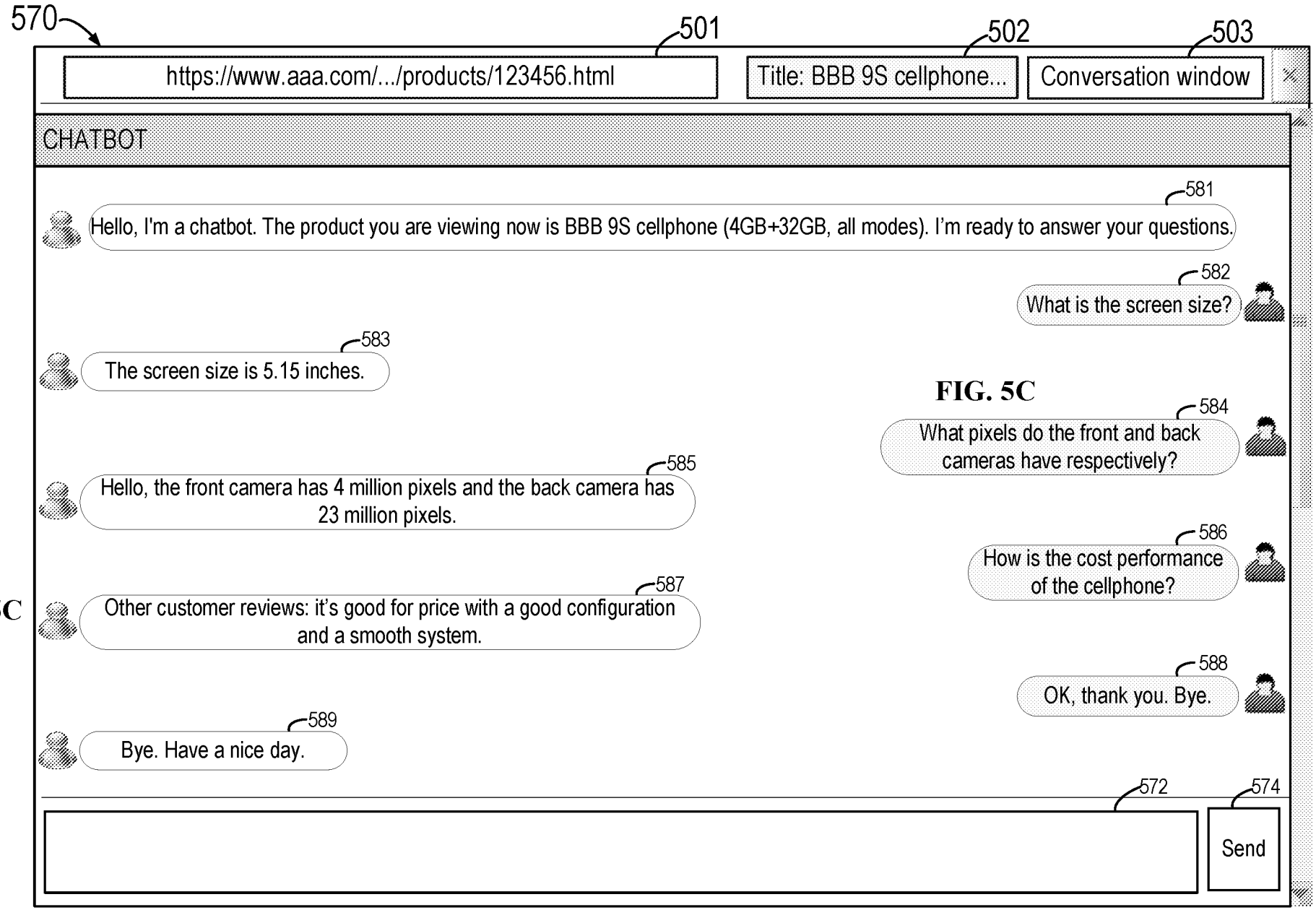

570
501
502
503
https://www.aaa.com/.../products/123456.html
Title: BBB 9S cellphone...
Conversation window
CHATBOT
581
Hello, I'm a chatbot. The product you are viewing now is BBB 9S cellphone (4GB+32GB, all modes). I'm ready to answer your questions.
582
What is the screen size?
583
The screen size is 5.15 inches.
584
What pixels do the front and back cameras have respectively?
585
Hello, the front camera has 4 million pixels and the back camera has 23 million pixels.
586
How is the cost performance of the cellphone?
587
Other customer reviews: it's good for price with a good configuration and a smooth system.
588
OK, thank you. Bye.
589
Bye. Have a nice day.
572
574
Send

FIG. 5C

FIG. 5C

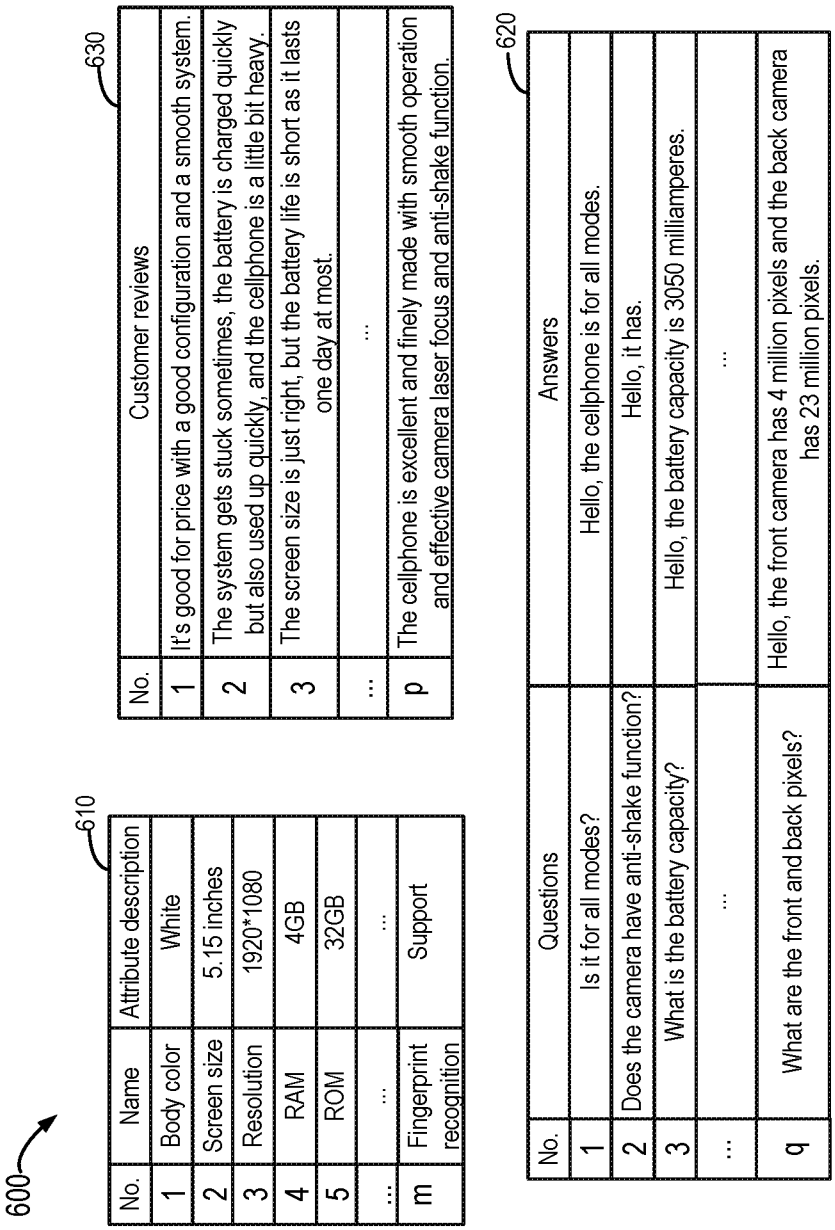

600
610
No. | Name | Attribute description
1 | Body color | White
2 | Screen size | 5.15 inches
3 | Resolution | 1920*1080
4 | RAM | 4GB
5 | ROM | 32GB
... | ... | ...
m | Fingerprint recognition | Support
630
No. | Customer reviews
1 | It's good for price with a good configuration and a smooth system.
2 | The system gets stuck sometimes, the battery is charged quickly but also used up quickly, and the cellphone is a little bit heavy.
3 | The screen size is just right, but the battery life is short as it lasts one day at most.
... | ...
p | The cellphone is excellent and finely made with smooth operation and effective camera laser focus and anti-shake function.
620
No. | Questions | Answers
1 | Is it for all modes? | Hello, the cellphone is for all modes.
2 | Does the camera have anti-shake function? | Hello, it has.
3 | What is the battery capacity? | Hello, the battery capacity is 3050 milliamperes.
... | ... | ...
q | What are the front and back pixels? | Hello, the front camera has 4 million pixels and the back camera has 23 million pixels.

FIG. 6

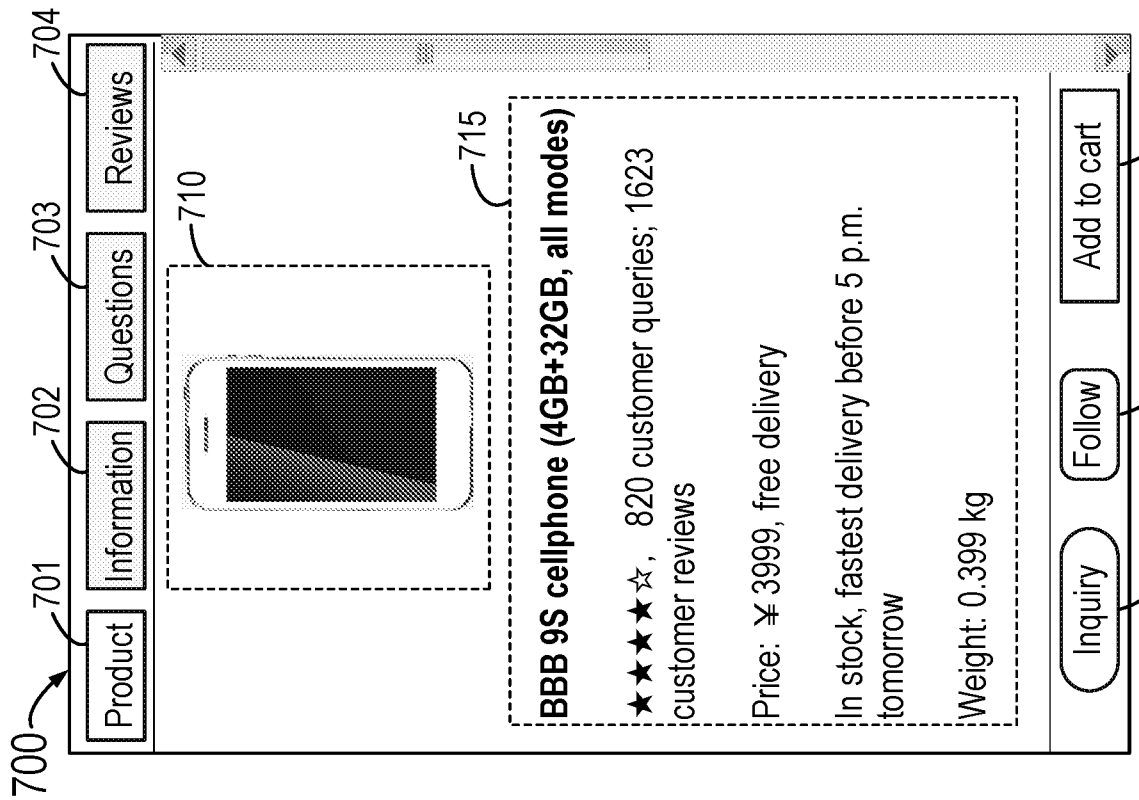

700
701
Product
702
Information
703
Questions
704
Reviews
710
715
BBB 9S cellphone (4GB+32GB, all modes)
★★★★☆, 820 customer queries; 1623 customer reviews
Price: ¥ 3999, free delivery
In stock, fastest delivery before 5 p.m. tomorrow
Weight: 0.399 kg
720
Inquiry
725
Follow
730
Add to cart

FIG. 7A

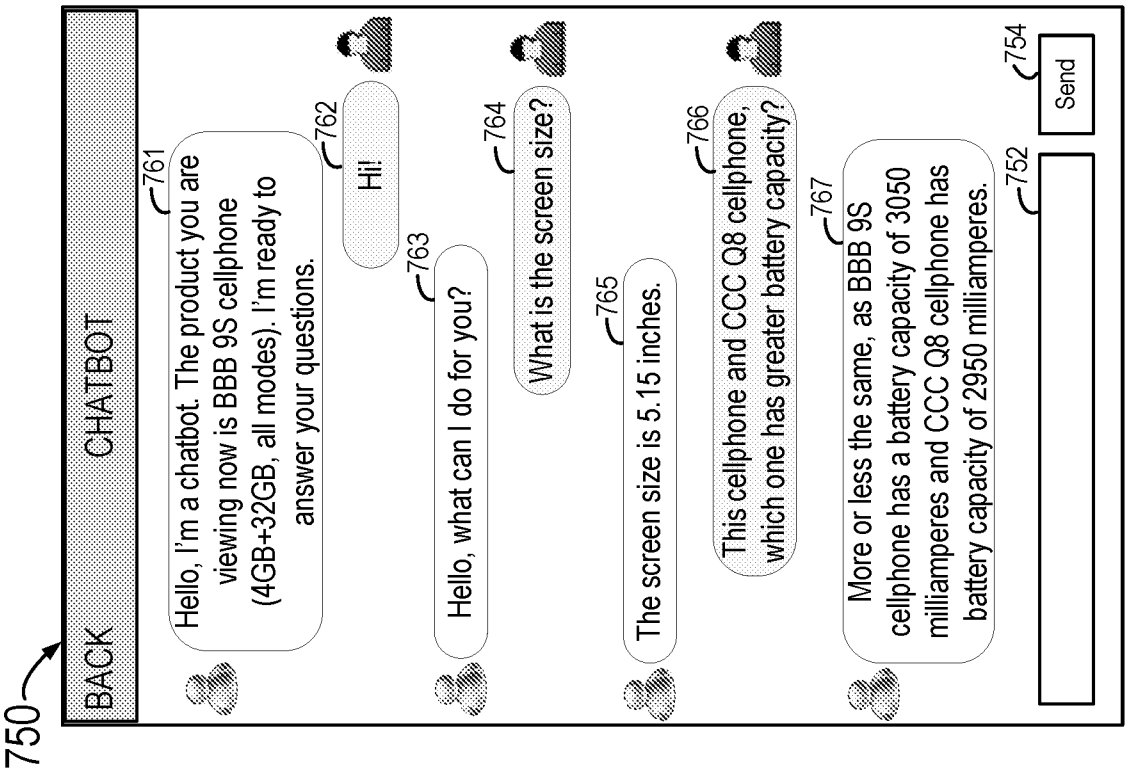

750
BACK
CHATBOT
761
Hello, I'm a chatbot. The product you are viewing now is BBB 9S cellphone (4GB+32GB, all modes). I'm ready to answer your questions.
762
Hi!
763
Hello, what can I do for you?
764
What is the screen size?
765
The screen size is 5.15 inches.
766
This cellphone and CCC Q8 cellphone, which one has greater battery capacity?
767
More or less the same, as BBB 9S cellphone has a battery capacity of 3050 milliamperes and CCC Q8 cellphone has battery capacity of 2950 milliamperes.
752
754
Send

FIG. 7B

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2018/028222

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06Q30/06 G06Q30/00
ADD.

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)
G06Q

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2015/088765 A1 (FULTON DAVID [US] ET AL) 26 March 2015 (2015-03-26) figures 1-5 paragraph [0019] paragraph [0021] - paragraph [0041] -----	1-15

☐ 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
7 June 2018	15/06/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Härdeman, David

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2018/028222

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2015088765 A1	26-03-2015	NONE	