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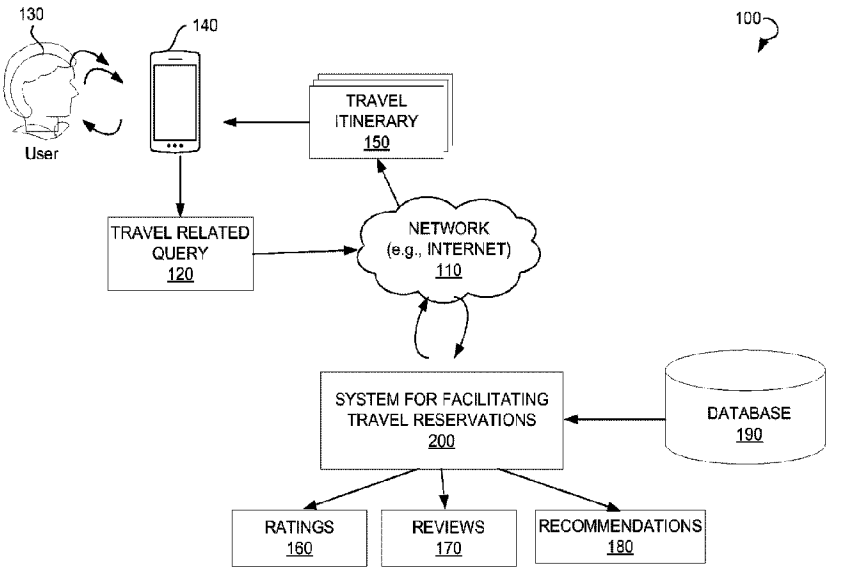

(57) Abrégé/Abstract:
A method for facilitating travel reservations is described. The method may commence with receiving a travel-related query from a user and parsing the travel-related query to derive at least one attribute of the travel-related query. One or more further users may be selected based on comparing the at least one attribute of the user with attributes of the one or more further users. The at least one attribute of the user may be ranked based on preference data of the one or more further users. The method may continue with assigning weights to the at least one attribute based on the ranking to create at least one weighted attribute. Feasible travel itineraries may be searched based on the at least one attribute and scored based on the at least one weighted attribute and travel itineraries selected based on the scoring may be presented.

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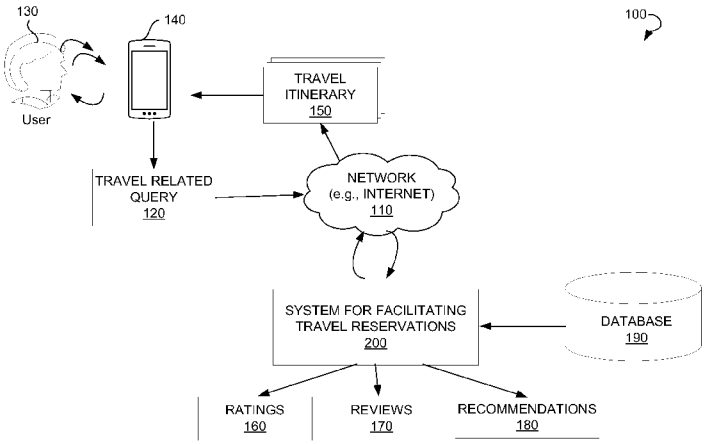

FIG. 1

(57) Abstract: A method for facilitating travel reservations is described. The method may commence with receiving a travel-related query from a user and parsing the travel-related query to derive at least one attribute of the travel-related query. One or more further users may be selected based on comparing the at least one attribute of the user with attributes of the one or more further users. The at least one attribute of the user may be ranked based on preference data of the one or more further users. The method may continue with assigning weights to the at least one attribute based on the ranking to create at least one weighted attribute. Feasible travel itineraries may be searched based on the at least one attribute and scored based on the at least one weighted attribute and travel itineraries selected based on the scoring may be presented.

WO 2016/205076 A1

SCORING SYSTEM FOR TRAVEL PLANNING

[0001]

TECHNICAL FIELD

[0002] The present disclosure relates to data processing and, more particularly, to facilitating travel reservations.

BACKGROUND

[0003] A travel consumer can conventionally enjoy the benefits of a diversity of choices: a marketplace that is replete with purchase options; numerous information sources that provide travel-related information and advice on everything from destinations to hotels and related points-of-interest; and finally, a reasonable degree of price transparency on a vast array of travel-related goods and services. While consumers derive much utility from this choice environment — enabled by online travel agencies (OTAs) and travel websites — the fact remains that the travel consumer is often encumbered by information abundance and by legacy technology platforms that almost invariably complicate the consumer's choice. For an average consumer, these choice-related challenges take many forms, such as a plurality of travel-related goals and objectives pertaining to all of the relevant facets and phases of the travel planning process; the existence of a large number of viable itinerary options to sort through,

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evaluate, and ultimately choose from; the existence of disparate and non-homogenous information sources, all of which possess varying degrees of quality, usefulness, and reliability; and the need to consider complex value trade-offs among key choice attributes and objectives (e.g., price vs. suitability of a selected flight for the consumer), together with the existence of often conflicting objectives (e.g., a desire for luxury, constrained by willingness-to-pay).

[0004] Empirical studies reveal that travelers are more likely to rely on advice and recommendations of friends, relatives, colleagues, and so forth than other information sources. Conventionally, the traveler can review the recommendations of friends by intentionally searching for them, for example, on a social network page of a friend or on a profile page of the friend on a travel website. However, the conventional OTAs do not take the recommendations of friends of the traveler into consideration when searching and presenting feasible travel itineraries to the traveler.

SUMMARY

[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 as an aid in determining the scope of the claimed subject matter.

[0006] According to one example embodiment of the disclosure, a method for facilitating travel reservations is provided. The method may commence with receiving a travel-related query from a user. The method may continue with parsing the travel-related query to derive at least one attribute related to the travel-related query. The travel-related query may include a natural language query. One or more further users may be selected by comparing the at least one attribute of the user with attributes of the one or more further users. The attributes of the one or more further users may match the at least one attribute of the user. The at least one attribute of the user may be ranked based on preference data of the one or more further users. Weights may be assigned to the at least one attribute based on the ranking to create at least one weighted attribute. The method may continue with searching for feasible travel itineraries based on the at least one attribute. Based on the at least one weighted attribute, the feasible travel itineraries may be scored. At least one travel itinerary selected from the feasible travel itineraries may be presented based on the scoring.

[0007] According to another example embodiment of the disclosure, a system for facilitating travel reservations is provided. The system may include a processor, a parser in communication with the processor, and a scheduler in communication with the processor. The processor may be operable to receive a travel-related query from a user. The parser may be operable to parse the travel-related query to derive the at least one attribute related to the travel-related query. The processor may be further operable to select one or more further users by comparing at least one attribute of the user with attributes of the one or more further users. The one or more further users may be

selected when the attributes of the one or more further users match the at least one attribute of the user. Upon the selection of the one or more further users, the processor may rank the at least one attribute of the user based on preference data of the one or more further users. The processor may be further operable to assign weights to the at least one attribute based on the ranking to create at least one weighted attribute. The scheduler may be operable to search for the feasible travel itineraries based on the at least one attribute. Upon the search, the processor may be operable to score feasible travel itineraries based on the at least one weighted attribute. The processor may further present at least one travel itinerary selected from the feasible travel itineraries based on the scoring.

[0008] Other example embodiments of the disclosure and aspects will become apparent from the following description taken in conjunction with the following drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Embodiments are illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements.

[0010] FIG. 1 illustrates an environment within which systems and methods for facilitating travel reservations can be implemented.

[0011] FIG. 2 is block diagram showing various modules of a system for facilitating travel reservations.

[0012] FIG. 3 is a process flow diagram showing a method for facilitating travel reservations.

[0013] FIG. 4 is a schematic diagram of travel itineraries found by a system for facilitating travel reservations.

[0014] FIG. 5 shows a diagrammatic representation of a computing device for a machine in the exemplary electronic form of a computer system, within which a set of instructions for causing the machine to perform any one or more of the methodologies discussed herein can be executed.

DETAILED DESCRIPTION

[0015] The following detailed description includes references to the accompanying drawings, which form a part of the detailed description. The drawings show illustrations in accordance with exemplary embodiments. These exemplary embodiments, which are also referred to herein as "examples," are described in enough detail to enable those skilled in the art to practice the present subject matter. The embodiments can be combined, other embodiments can be utilized, or structural, logical, and electrical changes can be made without departing from the scope of what is claimed. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope is defined by the appended claims and their equivalents.

[0016] The disclosure relates to facilitating travel reservations by accommodating and managing specific types of preference information, namely, ratings, recommendations, and (more generally) reviews of registered users of their travel experiences. More specifically, upon receiving a travel-related query from a user, a system for facilitating travel reservations may analyze the travel-related query to determine attributes related to the travel-related query. The system may further compare the attributes of the user with attributes of further users of the systems. The further users whose attributes match the attributes of the user may be selected. The system may search for feasible travel itineraries based on the travel-related query. Upon the search, the system may use preference data of the further users related to the travel itineraries, such as ratings, recommendations, and reviews, to score the feasible travel itineraries. The travel itineraries having the highest scores may be presented to the user.

[0017] FIG. 1 illustrates an environment 100 within which systems and methods for facilitating travel reservations can be implemented, in accordance with some embodiments. A travel-related query 120 of a user 130 may be received, for example, via a user interface displayed on a user device 140. The travel-related query 120 may include text data. The text data may be obtained as a natural language input by the

user, by speech-to-text conversion of an oral exchange with the user, or otherwise. In some embodiments, to motivate the user 130 to provide the travel-related query 120, the user 130 may be asked, orally, one or more motivating questions.

[0018] The travel-related query 120 may be transmitted to a system 200 for facilitating travel reservations via a network 110. The network 110 may include the Internet or any other network capable of communicating data between devices. Suitable networks may include or interface with any one or more of, for instance, a local intranet, a Personal Area Network, a Local Area Network (LAN), a Wide Area Network (WAN), a Metropolitan Area Network, a virtual private network, a storage area network, a frame relay connection, an Advanced Intelligent Network connection, a synchronous optical network connection, a digital T1, T3, E1 or E3 line, Digital Data Service connection, Digital Subscriber Line connection, an Ethernet connection, an Integrated Services Digital Network line, a dial-up port such as a V.90, V.34 or V.34bis analog modem connection, a cable modem, an Asynchronous Transfer Mode connection, or a Fiber Distributed Data Interface or Copper Distributed Data Interface connection. Furthermore, communications may also include links to any of a variety of wireless networks, including Wireless Application Protocol, General Packet Radio Service, Global System for Mobile Communication, Code Division Multiple Access or Time Division Multiple Access, cellular phone networks, Global Positioning System, cellular digital packet data, Research in Motion, Limited duplex paging network, Bluetooth radio, or an IEEE 802.11-based radio frequency network. The network 110 can further include or interface with any one or more of an RS-232 serial connection, an IEEE-1394 (Firewire) connection, a Fiber Channel connection, an IrDA (infrared) port, a Small Computer Systems Interface connection, a Universal Serial Bus connection or other wired or wireless, digital or analog interface or connection, mesh or Digi® networking. The network 110 may be a network of data processing nodes that are interconnected for the purpose of data communication. The network 110 may include any suitable number

and type of devices (e.g., routers and switches) for forwarding commands, content, and/or web object requests from each user and responses back to the users.

[0019] The user device 140, in some example embodiments, may include a Graphical User Interface for displaying the user interface associated with the system 200. The user device 140 may include a mobile telephone, a personal computer (PC), a laptop, a smart phone, a tablet PC, and so forth. The system 200 may include a server-based distributed application; thus, the system 200 may include a central component residing on a server and one or more client applications residing on one or more user devices, such as the user device 140, and communicating with the central component via the network 110. The user 130 may communicate with the system 200 via a client application available through the user device 140.

[0020] Travel itineraries available, for example, from a database 190 may be analyzed based on preference data of the one or more further users. The system 200 may use preference data of the further users related to the travel itineraries, such as ratings 160, reviews 170, and recommendations 180, to score feasible travel itineraries found for the user 130 based on the travel-related query 120. Based on the scoring, at least one travel itinerary 150 may be presented to the user 130 by displaying the travel itinerary 150 via the user interface on a screen of the user device 140.

[0021] FIG. 2 is a block diagram showing various modules of a system 200 for facilitating travel reservations, in accordance with certain embodiments. The system 200 may comprise a processor 210, a parser 220, a scheduler 230, and an optional database 240. The processor 210 may include a programmable processor, such as a microcontroller, central processing unit (CPU), and so forth. In other embodiments, the processor 210 may include an application-specific integrated circuit or programmable logic array, such as a field programmable gate array, designed to implement the functions performed by the system 200.

[0022] The processor 210 may be operable to receive a travel related query. The travel related query may be provided by a user, also referred to as a traveler. Moreover, the travel related query may be provided using a natural language, a typed text, a selection of preexisting options, and so forth. The system 200 may be both goal and preference driven. At a foundational level, consumer strategic intent may lie at the center of all travel planning actions and travel-related consumption. Accordingly, the system 200 may be designed to understand the travel-related query (stated in natural language, via voice or text) in terms of the determinate goals and objectives of a traveler, and to schedule travel itineraries — comprised of flights, hotel accommodations, car rental reservations, and so forth — that are both feasible and sensible. In order to achieve this functionality, the system 200 may require, for example, three informational elements, such as an understanding of origin(s) and desired destination(s) for respective travelers; desired date(s) and time(s) of travel; and consideration of relevant preferences (pertaining to, e.g., flight-related preferences, hotel-related preferences, and so forth). The third element — the consideration of relevant consumer preferences — may factor into how travel-related queries are serviced and customized within the system 200. Therefore, the parser 220 of the system 200 may be operable to parse the travel-related query to derive at least one attribute related to the travel-related query. The attribute sets may include, for example, an origin city, a destination city, a date of travel, time of travel, a hotel, a car reservation, and so forth.

[0023] The system 200 may incorporate a choice architecture (CA) provided to customize the itinerary creation and selection process, and to provide the traveler with the best possible travel buying experience. The construction of a requisite CA requires an awareness and understanding of the factors that drive or otherwise influence traveler choice in the travel space. At a foundational level, preferences and desires are what ultimately drive these choices, and the system 200 may therefore incorporate a number of preference representations and preference learning elements.

[0024] Much of how preferences are both modeled and managed in the system 200 may be predicated on a specific set of views as to the nature of travel-related preferences. The central preference-related tenets of the system 200 can be summarized as follows:

- Travel preferences are constructed as opposed to revealed;
- Travel preferences are context-dependent, and choices among travel-related options are also context-dependent;
- The relative value of a travel option depends not just on the characteristics of that option, but also on the characteristics of the other options in the choice set;
- Travel consumers often bring a plurality of goals and objectives to their purchase decisions.

[0025] Ratings and recommendations of travelers may constitute an important class of preference-based information that is both captured and utilized within the system 200. More specifically, since the system 200 may be a fully functioning e-commerce platform, the system 200 may have a wealth of transactional data that may be accumulated from use of the system 200 by registered travelers to book travel itineraries. Within the system 200, each transaction may be logged, together with the travel-related query (and the instantiated attributes for each travel-related query) that gave rise to the itinerary purchase decision. Any relevant feedback from the users in the form of ratings or recommendations may be conjoined with each transaction data log.

[0026] The processor 210 may be operable to compare at least one attribute of the user with attributes of the one or more further users. If a match of the attributes of the one or more further users and the at least one attribute of the user is found, the processor 210 may select one or more further users.

[0027] In a further example embodiment, the processor 210 may be further operable to combine the one or more further users into a subset based on the attributes of the one or more further users. In this case, the user may select the subset of users, from which

the one or more further users are to be selected. Therefore, in this embodiment, the selection of the one or more further users may include selection of the one or more further users from the subset. In an example embodiment, within the system 200, users can avail themselves of ratings information and/or recommendations that are community-based, drawn from relevant pools or subsets of the registered user-base for the platform. Each registered user can define one or more "communities" from which to draw ratings/recommendation information. The user can construct "communities" (or even "meta-" or "hybrid-communities" that combine two or more predefined community groups, using aggregation methods whose parameters are customizable by the user) that are comprised of individuals that share similar socio-demographic identifiers (e.g., age, gender, education, and so forth), interests, destinations, hobbies, and so forth.

[0028] Additionally, the system 200 can enable users to identify some users of the system 200 as "friends." Ratings/recommendations of users marked as "friends" may factor into itinerary creation and selection process for the user.

[0029] The system 200 can implement a number of algorithms and analytic frameworks that can enable the ratings and recommendations to be used for both predictive and prescriptive analytic purposes. Central in this regard are knowledge-based methods that invoke domain knowledge and expertise about how platform-based content may potentially meet the explicit (or implicit or inferred) needs/preferences of the consumer. Natural language examples of these types of search queries include:

- "I am going to Vegas; where do people like me usually stay?"
- "Where do my friends stay when they go to Malibu?"
- "I am looking for hotels in NYC with a nearby park to run in..."

[0030] Upon the selection of the one or more further users, whose attributes match the at least one attribute of the user, the processor 210 may be operable to rank the at least one attribute of the user based on preference data of the one or more further users. The preference data of the one or more further users may include one or more of the

following: ratings associated with travel itineraries, recommendations associated with travel itineraries, reviews associated with travel itineraries, and so forth. The preference data of the one or more further users may be received from the optional database 240. The processor 210 may be operable to assign weights to the at least one attribute of the user based on the ranking to create at least one weighted attribute.

[0031] In an example embodiment, to the extent that a user wants to utilize ratings/reviews/recommendations from information sources that are external to the system 200 (e.g., from a third-party organization), the system 200 may enable the user to construct composite scores or indices for the ratings/reviews/recommendations from third-party organizations, which can also be brought into the itinerary search, evaluation, and booking process. More specifically, the scheduler 230 may be operable to search for feasible travel itineraries based on the at least one attribute. When the feasible travel itineraries are found by the scheduler 230, the processor 210 may be operable to score the feasible travel itineraries based on the at least one weighted attribute. In an example embodiment, within the CA, scoring can be based, in part, on the users who actually booked a stay at a particular hotel via the system 200, or flew a particular route on a particular airline.

[0032] Upon scoring, the processor 210 may select at least one travel itinerary from the feasible travel itineraries based on the scoring and present a selected travel itinerary to the user on the user device.

[0033] Moreover, the users may be able to assign their own (subjectively assigned) measures of "trust" or "confidence" in each individual information source (e.g., "my confidence in the ratings from Hotels.com is 70%, whereas for Tripadvisor.com, my confidence is only 30%"). Additionally, the processor 210 may be further configured to receive a setting of a trust level for the one or more further users from the user. In this case, the ranking of the at least one attribute of the user may be further based on the trust level of the one or more further users. More specifically, the results of the itinerary

creation and selection process for the user can be further refined by specifying trust/credence/veracity levels for members of a group or sub-group (for example, members of the subset).

[0034] In an example embodiment, the processor 210 may be further operable to receive a selection of one or more identifiers from the user. The one or more identifiers may include one or more of the following: a gender, an age, an education, interests, a hobby, and so forth. Based on the one or more identifiers, the processor 210 may combine the one or more further users into a subset.

[0035] In a further example embodiment, the processor 210 may be further configured to receive a selection of at least one further user marked as a friend from the user. In this embodiment, the ranking of the at least one attribute of the user may be further based on preference data of the at least one further user.

[0036] Additionally, the processor 210 may be further operable to receive a feedback associated with the at least one travel itinerary from the user. The feedback may include one or more of the following: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, a review associated with the at least one travel itinerary, and so forth. The user may provide the feedback after the user has actually booked a stay at a particular hotel, flew a particular route on a particular airline, and the like.

[0037] In an example embodiment, all users of the system 200 may be provided with the instrumental means by which the users may convey their preferences and needs. Moreover, the users may be allowed to customize how their ratings are encoded/represented (with concomitant trade-offs regarding assessment effort versus information content/quality), and how the information is utilized within the CA for customizing travel itineraries. More broadly, the users of the system 200 may have an option of specifying how their behavioral usage data (e.g., browsing/search patterns and so forth) are utilized within the system 200 as a whole. More specifically, the behavioral

usage data, travel-related queries, and instantiated attributes associated with the travel-related queries may be stored in the optional database 240. In an example embodiment, the user can choose a privacy mode of interaction with the system 200 where no behavioral usage data may be stored to the optional database 240 or used by the system 200 for customizing travel itineraries.

[0038] FIG. 3 is a process flow diagram showing a method 300 for facilitating travel reservations within the environment described with reference to FIG. 1. The method 300 may commence with receiving a travel-related query from a user at operation 310. In an example embodiment, the travel-related query may include one or more of the following: a natural language query, a typed text query, a selection of preexisting options, and so forth. The method 300 may continue with parsing the travel-related query to derive at least one attribute related to the travel-related query at operation 320. At operation 330, one or more further users may be selected by comparing the at least one attribute of the user with attributes of the one or more further users. The attributes of the one or more further users may match the at least one attribute of the user. The at least one attribute of the user may be ranked based on preference data of the one or more further users at operation 340. In some embodiments, the preference data of the one or more further users may include one or more of the following: ratings associated with travel itineraries, recommendations associated with travel itineraries, reviews associated with travel itineraries, and so forth.

[0039] At operation 350, weights may be assigned to the at least one attribute based on the ranking to create at least one weighted attribute. The method 300 may continue with operation 360, at which feasible travel itineraries may be searched based on the least one attribute. Based on the at least one weighted attribute, the feasible travel itineraries may be scored at operation 370. The method 300 may further include presenting at least one travel itinerary to the user at operation 380. The at least one

travel itinerary presented to the user may be selected from the feasible travel itineraries based on the scoring.

[0040] The method 300 may further optionally include receiving a feedback associated with at least one travel itinerary from the user. The feedback may include one or more of the following: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, a review associated with the at least one travel itinerary, and so forth. The feedback may be stored to a database and used for selection of travel itinerates in response to further travel-related queries.

[0041] In a further example embodiment, the method 300 may optionally include combining the one or more further users into a subset based on the attributes of the one or more further users. A selection of the subset may be received from the user. In this embodiment, the selection of the one or more further users may include selecting the one or more further users from the subset.

[0042] The method 300 may further optionally include receiving a selection of one or more identifiers from the user and combining the one or more further users into a subset based on the one or more identifiers. The one or more identifiers include one or more of the following: a gender, an age, an education, interests, a hobby, and so forth.

[0043] In a further example embodiment, the method 300 may optionally include receiving from the user a selection of at least one further user marked as a friend. In this embodiment, the ranking may include ranking of the at least one attribute of the user based on preference data of the at least one further user marked as a friend.

[0044] The method 300 may further optionally include receiving, from the user a setting of a trust level for the one or more further users. In this embodiment, the ranking of the at least one attribute of the user may be further based on the trust level of the one or more further users.

[0045] FIG. 4. shows a schematic diagram 400 of travel itineraries found by a scheduler of the system for facilitating travel reservations. In particular, the scheduler may perform the search in feasible travel itineraries 402. As a result of the search, travel itineraries 1-7 shown as travel itineraries 404 may be found. Each of the travel itineraries 404 may have weights 406 assigned based on preference data of one or more further users.

[0046] FIG. 5 shows a diagrammatic representation of a computing device for a machine in the exemplary electronic form of a computer system 500, within which a set of instructions for causing the machine to perform any one or more of the methodologies discussed herein can be executed. In various exemplary embodiments, the machine operates as a standalone device or can be connected (e.g., networked) to other machines. In a networked deployment, the machine can operate in the capacity of a server or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine can be a PC, a tablet PC, a set-top box, a cellular telephone, a digital camera, a portable music player (e.g., a portable hard drive audio device, such as an Moving Picture Experts Group Audio Layer 3 player), a web appliance, a network router, a switch, a bridge, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term "machine" shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

[0047] The computer system 500 includes a processor or multiple processors 502, a hard disk drive 504, a main memory 506, and a static memory 508, which communicate with each other via a bus 510. The computer system 500 may also include a network interface device 512. The hard disk drive 504 may include a computer-readable medium 520, which stores one or more sets of instructions 522 embodying or utilized by any one

or more of the methodologies or functions described herein. The instructions 522 can also reside, completely or at least partially, within the main memory 506 and/or within the processors 502 during execution thereof by the computer system 500. The main memory 506 and the processors 502 also constitute machine-readable media.

[0048] While the computer-readable medium 520 is shown in an exemplary embodiment to be a single medium, the term "computer-readable medium" should be taken to include a single medium or multiple media (e.g., a centralized or distributed database, and/or associated caches and servers) that store the one or more sets of instructions. The term "computer-readable medium" shall also be taken to include any medium that is capable of storing, encoding, or carrying a set of instructions for execution by the machine and that causes the machine to perform any one or more of the methodologies of the present application, or that is capable of storing, encoding, or carrying data structures utilized by or associated with such a set of instructions. The term "computer-readable medium" shall accordingly be taken to include, but not be limited to, solid-state memories, optical and magnetic media. Such media can also include, without limitation, hard disks, floppy disks, NAND or NOR flash memory, digital video disks, Random Access Memory (RAM), Read-Only Memory (ROM), and the like.

[0049] The exemplary embodiments described herein can be implemented in an operating environment comprising computer-executable instructions (e.g., software) installed on a computer, in hardware, or in a combination of software and hardware. The computer-executable instructions can be written in a computer programming language or can be embodied in firmware logic. If written in a programming language conforming to a recognized standard, such instructions can be executed on a variety of hardware platforms and for interfaces to a variety of operating systems.

[0050] In some embodiments, the computer system 500 may be implemented as a cloud-based computing environment, such as a virtual machine operating within a

computing cloud. In other embodiments, the computer system 500 may itself include a cloud-based computing environment, where the functionalities of the computer system 500 are executed in a distributed fashion. Thus, the computer system 500, when configured as a computing cloud, may include pluralities of computing devices in various forms, as will be described in greater detail below.

[0051] In general, a cloud-based computing environment is a resource that typically combines the computational power of a large grouping of processors (such as within web servers) and/or that combines the storage capacity of a large grouping of computer memories or storage devices. Systems that provide cloud-based resources may be utilized exclusively by their owners, or such systems may be accessible to outside users who deploy applications within the computing infrastructure to obtain the benefit of large computational or storage resources.

[0052] The cloud may be formed, for example, by a network of web servers that comprise a plurality of computing devices, such as a client device, with each server (or at least a plurality thereof) providing processor and/or storage resources. These servers may manage workloads provided by multiple users (e.g., cloud resource consumers or other users). Typically, each user places workload demands upon the cloud that vary in real-time, sometimes dramatically. The nature and extent of these variations typically depends on the type of business associated with the user.

[0053] It is noteworthy that any hardware platform suitable for performing the processing described herein is suitable for use with the technology. The terms "computer-readable storage medium" and "computer-readable storage media" as used herein refer to any medium or media that participate in providing instructions to a CPU for execution. Such media can take many forms, including, but not limited to, non-volatile media, volatile media and transmission media. Non-volatile media include, for example, optical or magnetic disks, such as a fixed disk. Volatile media include dynamic memory, such as a system RAM. Transmission media include coaxial cables,

copper wire, and fiber optics, among others, including the wires that comprise one embodiment of a bus. Transmission media can also take the form of acoustic or light waves, such as those generated during radio frequency (RF) and infrared (IR) data communications. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, a hard disk, magnetic tape, any other magnetic medium, a Compact Disc Read-Only Memory disk, a digital video disk, any other optical medium, any other physical medium with patterns of marks or holes, a RAM, a Programmable Read-Only Memory, an Erasable Programmable Read-Only Memory (EPROM), an Electrically Erasable Programmable Read-Only Memory, a FlashEPROM, any other memory chip or data exchange adapter, a carrier wave, or any other medium from which a computer can read.

[0054] Various forms of computer-readable media may be involved in carrying one or more sequences of one or more instructions to a CPU for execution. A bus carries the data to a system RAM, from which the CPU retrieves and executes the instructions. The instructions received by the system RAM can optionally be stored on a fixed disk either before or after execution by the CPU.

[0055] Computer program code for carrying out operations for aspects of the present technology may be written in any combination of one or more programming languages, including an object oriented programming language such as Java, Smalltalk, C++ or the like and conventional procedural programming languages, such as the "C" programming language or similar programming languages. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user's computer and partly on a remote computer or entirely on the remote computer or server. In the latter scenario, the remote computer may be connected to the user's computer through any type of network, including a LAN or a WAN, or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

[0056] The corresponding structures, materials, acts, and equivalents of all means or steps plus function elements in the claims below are intended to include any structure, material, or act for performing the function in combination with other claimed elements as specifically claimed. The description of the present technology has been presented for purposes of illustration and description, but is not intended to be exhaustive or limited to the disclosure. Many modifications and variations will be apparent to those of ordinary skill in the art without departing from the scope and spirit of the disclosure. Exemplary embodiments were chosen and described in order to best explain the principles of the present technology and its practical application, and to enable others of ordinary skill in the art to understand the disclosure for various embodiments with various modifications as are suited to the particular use contemplated.

[0057] Aspects of the present technology are described above with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems), and computer program products according to embodiments of the disclosure. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks. These computer program instructions may also be stored in a computer readable medium that can direct a computer, other programmable data processing apparatus, or other devices to function in a particular manner, such that the instructions stored in the computer readable medium produce an article of manufacture including instructions

which implement the function/act specified in the flowchart and/or block diagram block or blocks.

[0058] Thus, computer-implemented methods and systems for managing interactions between a user and applications are described. Although embodiments have been described with reference to specific exemplary embodiments, it will be evident that various modifications and changes can be made to these exemplary embodiments without departing from the broader spirit and scope of the present application. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense.

CLAIMS

What is claimed is:

1. A system for facilitating travel reservations, the system comprising:

a processor operable to:

receive a travel-related query from a user via a user device;

select one or more further users, wherein the selecting includes comparing at least one attribute of the user with attributes of the one or more further users, wherein the attributes of the one or more further users match the at least one attribute of the user;

combine the one or more further users into a subset based on the attributes of the one or more further users, wherein a selection of the subset is received from the user;

rank the at least one attribute of the user based on preference data of the one or more further users with respect to travel itineraries;

assign weights to the at least one attribute based on the ranking to create at least one weighted attribute;

score feasible travel itineraries based on the at least one weighted attribute; and

transmit the feasible travel itineraries to the user device to present, to the user via the user device, at least one travel itinerary selected from the feasible travel itineraries based on the scoring;

a parser in communication with the processor and operable to:

parse the travel-related query to derive the at least one attribute related to the travel-related query; and

a scheduler in communication with the processor and operable to:

Page Rescue/Date Received 2022-04-08

search for the feasible travel itineraries based on the at least one attribute.

2. The system of claim 1, wherein the travel-related query includes one or more of: a natural language query, a typed text query, and a selection of preexisting options.

3. The system of claim 1, wherein the preference data of the one or more further users includes one or more of: ratings associated with the travel itineraries, recommendations associated with the travel itineraries, and reviews associated with the travel itineraries.

4. The system of claim 1, wherein the processor is further operable to receive a feedback associated with the at least one travel itinerary from the user.

5. The system of claim 4, wherein the feedback includes one or more of: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, and a review associated with the at least one travel itinerary.

6. The system of claim 1, wherein the selecting of the one or more further users includes selecting the one or more further users from the subset.

7. The system of claim 1, wherein the processor is further operable to:

receive a selection of one or more identifiers from the user, wherein the one or more identifiers include one or more of: a gender, an age, an education, interests, and a hobby; and

Page Rescue/Date Received 2022-04-08

combine the one or more further users into a subset based on the one or more identifiers.

8. The system of claim 1, wherein the processor is further operable to receive a selection of at least one further user marked as a friend from the user, wherein the ranking is further based on preference data of the at least one further user.

9. The system of claim 1, wherein the processor is further operable to receive a setting of a trust level for the one or more further users from the user, wherein the ranking of the at least one attribute of the user is further based on the trust level of the one or more further users.

10. A method for facilitating travel reservations, the method comprising:

receiving, by a processor, a travel-related query from a user via a user device;

parsing, by a parser, the travel-related query to derive at least one attribute related to the travel-related query;

selecting, by the processor, one or more further users, wherein the selecting includes comparing the at least one attribute of the user with attributes of the one or more further users, wherein the attributes of the one or more further users match the at least one attribute of the user;

combining, by the processor, the one or more further users into a subset based on the attributes of the one or more further users, wherein a selection of the subset is received from the user;

ranking, by the processor, the at least one attribute of the user based on preference data of the one or more further users with respect to travel itineraries;

assigning, by the processor, weights to the at least one attribute based on the ranking to create at least one weighted attribute;

Data Rescue/Date Received 2022-04-08

searching, by a scheduler, for feasible travel itineraries based on the at least one attribute;

scoring, by the processor, the feasible travel itineraries based on the at least one weighted attribute;

transmitting, from the processor to the user device, the feasible travel itineraries; and

presenting, to the user via the user device, at least one travel itinerary selected from the feasible travel itineraries based on the scoring.

11. The method of claim 10, wherein the travel-related query includes one or more of: a natural language query, a typed text query, and a selection of preexisting options.

12. The method of claim 10, wherein the preference data of the one or more further users includes one or more of: ratings associated with the travel itineraries, recommendations associated with the travel itineraries, and reviews associated with the travel itineraries.

13. The method of claim 10, further comprising receiving, by the processor, a feedback associated with the at least one travel itinerary from the user, wherein the feedback includes one or more of: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, and a review associated with the at least one travel itinerary.

14. The method of claim 10, wherein the selecting of the one or more further users includes selecting the one or more further users from the subset.

Data Rescue/Date Received 2022-04-08

15. The method of claim 10, further comprising:

receiving, by the processor, a selection of one or more identifiers from the user, wherein the one or more identifiers include one or more of: a gender, an age, an education, interests, and a hobby; and

combining, by the processor, the one or more further users into a subset based on the one or more identifiers.

16. The method of claim 10, further comprising receiving, by the processor, a selection of at least one further user marked as a friend from the user, wherein the ranking is further based on preference data of the at least one further user.

17. The method of claim 10, further comprising receiving, by the processor, a setting of a trust level for the one or more further users from the user, wherein the ranking of the at least one attribute of the user is further based on the trust level of the one or more further users.

18. A system for facilitating travel reservations, the system comprising:

a processor operable to:

receive a travel-related query from a user via a user device, the travel-related query including at least a natural language query;

receive a selection of one or more identifiers from the user, wherein the one or more identifiers include one or more of: a gender, an age, an education, interests, and a hobby;

combine one or more further users into a subset based on the one or more identifiers;

select the one or more further users, wherein the selecting includes comparing at least one attribute of the user with attributes of the one or more

Page Rescue/Date Received 2022-04-08

further users, wherein the attributes of the one or more further users match the at least one attribute of the user, wherein the selecting of the one or more further users includes selecting the one or more further users from the subset;

receive a selection of at least one further user marked as a friend from the user;

rank the at least one attribute of the user based on preference data of the one or more further users with respect to travel itineraries, wherein the ranking includes ranking of the at least one attribute of the user based on preference data of the at least one further user;

assign weights to the at least one attribute based on the ranking to create at least one weighted attribute;

score feasible travel itineraries based on the at least one weighted attribute;

transmit the feasible travel itineraries to the user device to present, to the user via the user device, at least one travel itinerary selected from the feasible travel itineraries based on the scoring; and

receive a feedback associated with the at least one travel itinerary from the user, wherein the feedback includes one or more of: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, and a review associated with the at least one travel itinerary;

a parser in communication with the processor and operable to:

parse the travel-related query to derive the at least one attribute related to the travel-related query; and

a scheduler in communication with the processor and operable to:

search for the feasible travel itineraries based on the at least one attribute.

Date Recue/Date Received 2022-04-08

19. A system for facilitating travel reservations, the system comprising:

a database configured with available travel itineraries and travel preferences for one or more users;

a parser in communication with a processor and operable to:

parse a travel-related query to derive at least one attribute related to the travel preferences for a user and a context from the travel-related query;

the processor in communication with the database and operable to:

receive the travel-related query from the user via a user device;

receive the travel preferences for one or more further users from the database;

construct a set of travel preferences for the user based on at least two of: the available travel itineraries in the database, the context from the travel-related query, and the travel preferences for the one or more further users;

a scheduler in communication with the processor and operable to:

search for a plurality of feasible travel itineraries based on the set of travel preferences;

score each feasible travel itinerary of the plurality of feasible travel itineraries based on the set of travel preferences; and

select at least one travel itinerary from the plurality of feasible travel itineraries based on the scoring.

20. The system of claim 19, wherein the travel-related query includes one or more of: a natural language query, a typed text query, and a selection of preexisting options.

Date Recue/Date Received 2022-04-08

21. The system of claim 19, further comprising the predefined user travel preferences being responsive to the travel-related query.

22. The system of claim 21 wherein the travel preferences comprise a preference learning element.

23. The system of claim 21 wherein the travel preferences comprise a preference representation.

24. The system of claim 19, further comprising the database configured to receive a rating and a recommendation of a traveler.

25. The system of claim 19 wherein the processor is further operable to:

receive a feedback associated with the at least one travel itinerary from the user, wherein the feedback includes one or more of: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, and a review associated with the at least one travel itinerary; and

update the travel preferences in the database with one or more of: the travel-related query and the feedback.

26. A method for facilitating travel reservations, the method comprising:

configuring a database with available travel itineraries and travel preferences for one or more users;

establishing a parser in communication with a processor and operable to:

parse the travel-related query to derive at least one attribute related to the travel preferences for a user and a context from a travel-related query;

receiving the travel-related query from the user via a user device;

Page Rescue/Date Received 2022-04-08

receiving the travel preferences for one or more further users from the database;

constructing a set of travel preferences for the user based on at least two of: the available travel itineraries in the database, the context from the travel-related query, and the travel preferences for the one or more further users;

searching for a plurality of feasible travel itineraries based on the set of travel preferences;

scoring each feasible travel itinerary of the plurality of feasible travel itineraries based on the set of travel preferences; and

selecting at least one travel itinerary from the feasible travel itineraries based on the scoring.

27. The method of claim 26, wherein the travel-related query includes one or more of: a natural language query, a typed text query, and a selection of preexisting options.

28. The method of claim 26, further comprising the travel preferences being responsive to the travel-related query.

29. The method of claim 28, further comprising establishing a preference learning element.

30. The method of claim 28, further comprising establishing a preference representation.

31. The method of claim 30, further comprising configuring the database to receive a rating and a recommendation of a traveler.

Page Rescue/Date Received 2022-04-08

32. The method of claim 26, further comprising:

receiving, by the processor, a feedback associated with the at least one travel itinerary from the user, wherein the feedback includes one or more of: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, and a review associated with the at least one travel itinerary; and

updating, by the processor, the travel preferences in the database with one or more of: the travel-related query and the feedback.

33. A system for facilitating travel reservations, the system comprising:

a database configured with available travel itineraries and travel preferences for one or more users;

a parser in communication with a processor and operable to:

parse a travel-related query to derive at least one attribute related to the travel preferences for a user and a context from the travel-related query;

the processor in communication with the database and operable to:

receive the travel-related query from the user via a user device, the travel-related query including at least a natural language query;

receive a selection of one or more identifiers from the user, wherein the one or more identifiers include one or more of: a gender, an age, an education, interests, and a hobby;

receive the travel preferences for one or more further users from the database;

construct a set of travel preferences for the user based on at least two of: the available travel itineraries in the database, the context for the travel-related query, and the travel preferences for the one or more further users;

Date Reçue/Date Received 2022-04-08

receive a feedback associated with at least one travel itinerary from the user, wherein the feedback includes one or more of: a rating associated with the at least one travel itinerary, a recommendation associated with the at least one travel itinerary, and a review associated with the at least one travel itinerary;

a scheduler in communication with the processor and operable to:

search for a plurality of feasible travel itineraries based on the set of travel preferences;

score each feasible travel itineraries of a plurality of feasible travel itineraries based on the set of travel preferences; and

select the at least one travel itinerary from the feasible travel itineraries based on the scoring.

34. The system of claim 33, further comprising the processor being operable to update the travel preferences in the database with one or more of: the travel-related query and the feedback.

Date Rescue/Date Received 2022-04-08

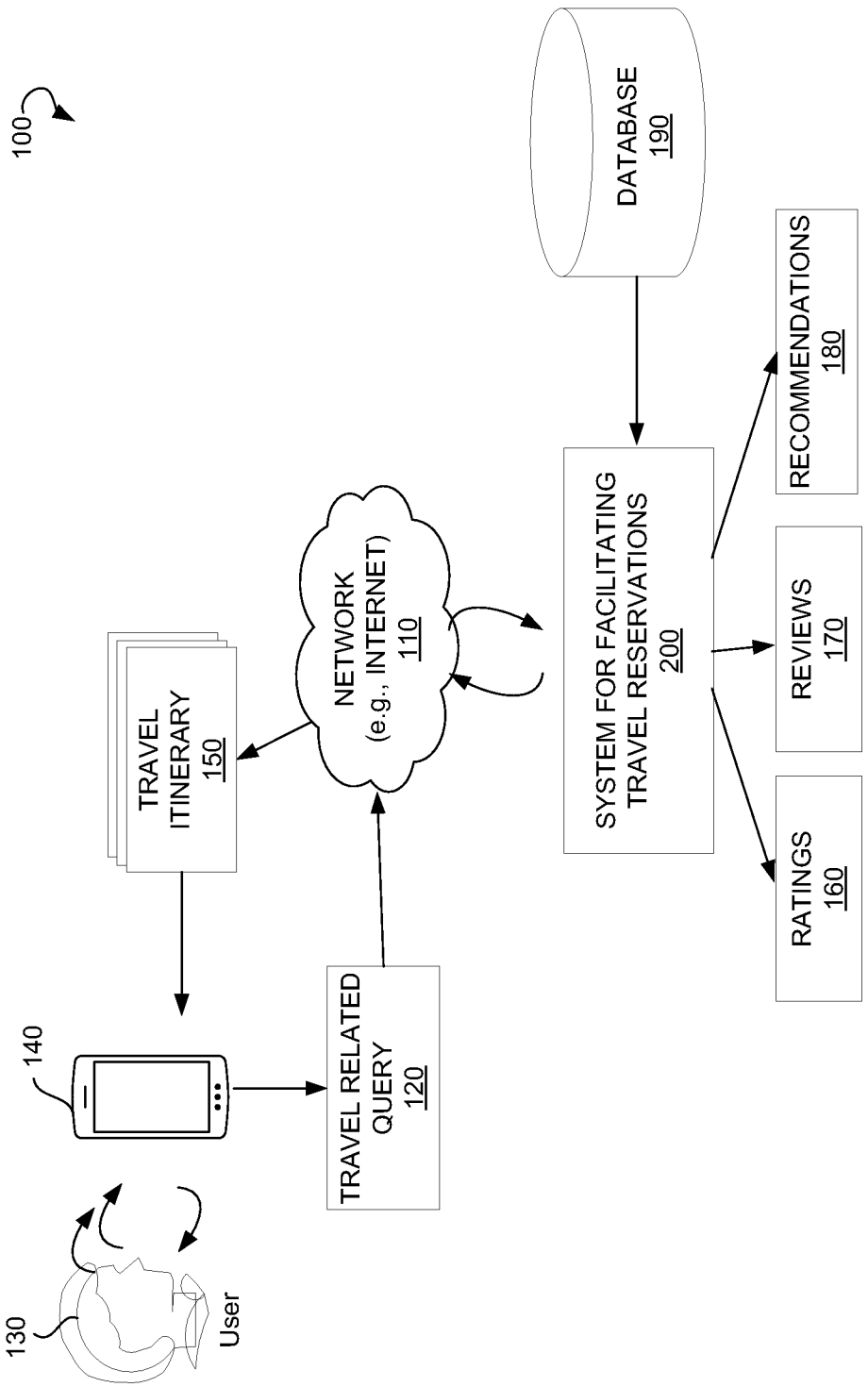

100
DATABASE
190
RECOMMENDATIONS
180
SYSTEM FOR FACILITATING
TRAVEL RESERVATIONS
200
REVIEWS
170
RATINGS
160
NETWORK
(e.g., INTERNET)
110
TRAVEL
ITINERARY
150
TRAVEL RELATED
QUERY
120
140
130
User

FIG. 1

1/5

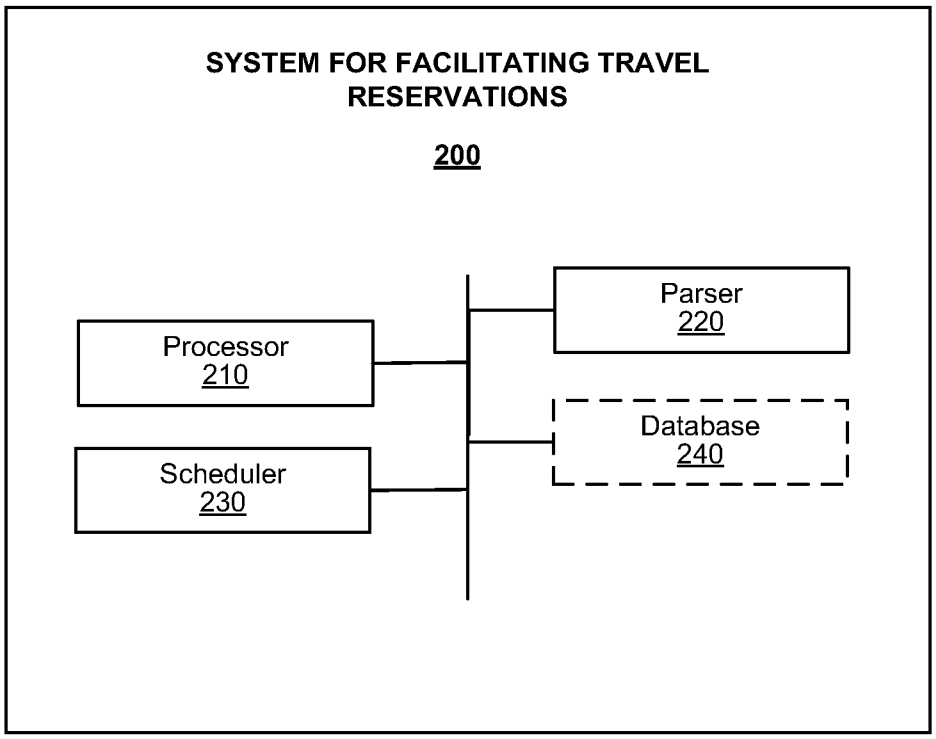

SYSTEM FOR FACILITATING TRAVEL RESERVATIONS
200
Processor
210
Scheduler
230
Parser
220
Database
240

FIG. 2

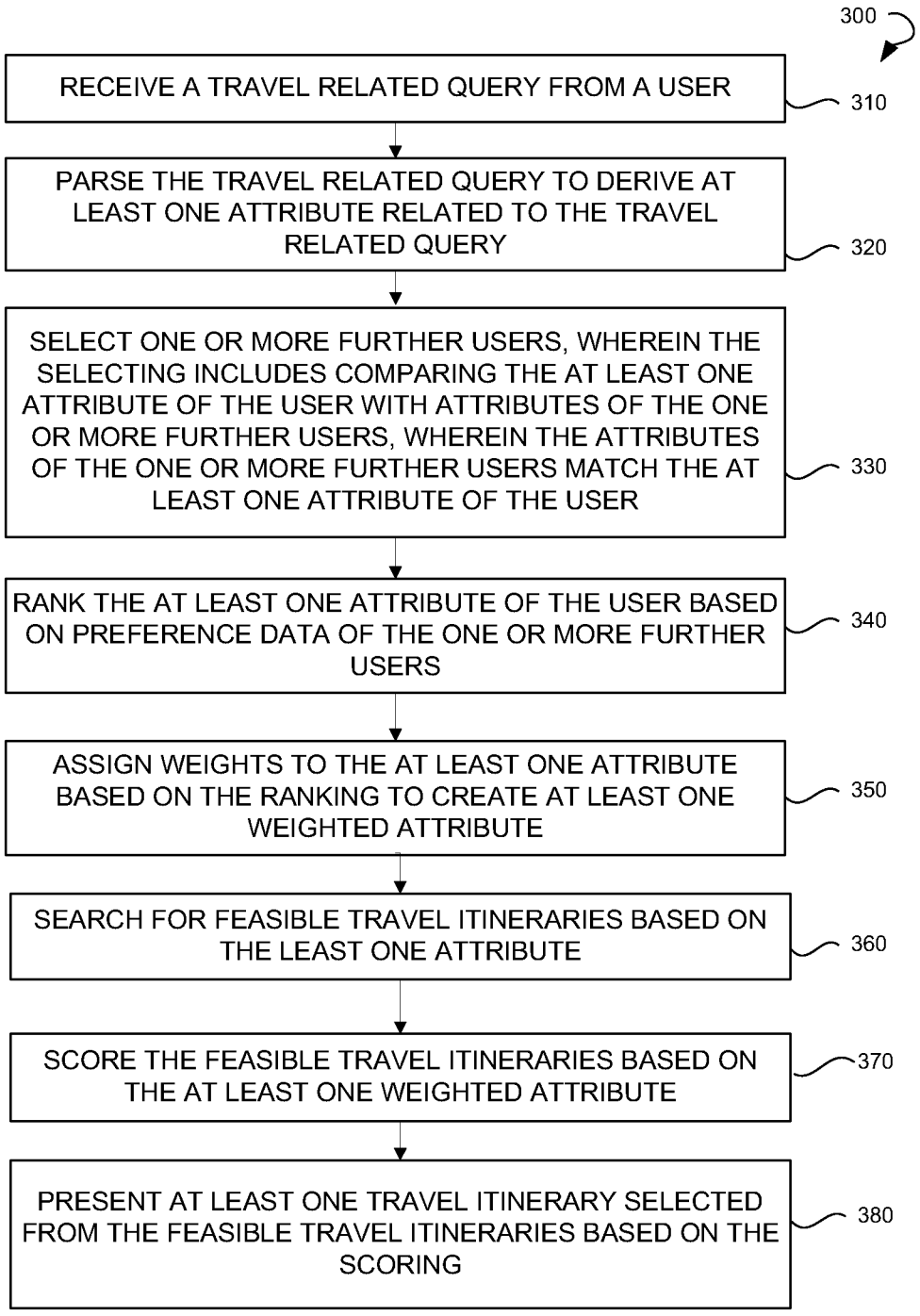

300
RECEIVE A TRAVEL RELATED QUERY FROM A USER
310
PARSE THE TRAVEL RELATED QUERY TO DERIVE AT LEAST ONE ATTRIBUTE RELATED TO THE TRAVEL RELATED QUERY
320
SELECT ONE OR MORE FURTHER USERS, WHEREIN THE SELECTING INCLUDES COMPARING THE AT LEAST ONE ATTRIBUTE OF THE USER WITH ATTRIBUTES OF THE ONE OR MORE FURTHER USERS, WHEREIN THE ATTRIBUTES OF THE ONE OR MORE FURTHER USERS MATCH THE AT LEAST ONE ATTRIBUTE OF THE USER
330
RANK THE AT LEAST ONE ATTRIBUTE OF THE USER BASED ON PREFERENCE DATA OF THE ONE OR MORE FURTHER USERS
340
ASSIGN WEIGHTS TO THE AT LEAST ONE ATTRIBUTE BASED ON THE RANKING TO CREATE AT LEAST ONE WEIGHTED ATTRIBUTE
350
SEARCH FOR FEASIBLE TRAVEL ITINERARIES BASED ON THE LEAST ONE ATTRIBUTE
360
SCORE THE FEASIBLE TRAVEL ITINERARIES BASED ON THE AT LEAST ONE WEIGHTED ATTRIBUTE
370
PRESENT AT LEAST ONE TRAVEL ITINERARY SELECTED FROM THE FEASIBLE TRAVEL ITINERARIES BASED ON THE SCORING
380

FIG. 3

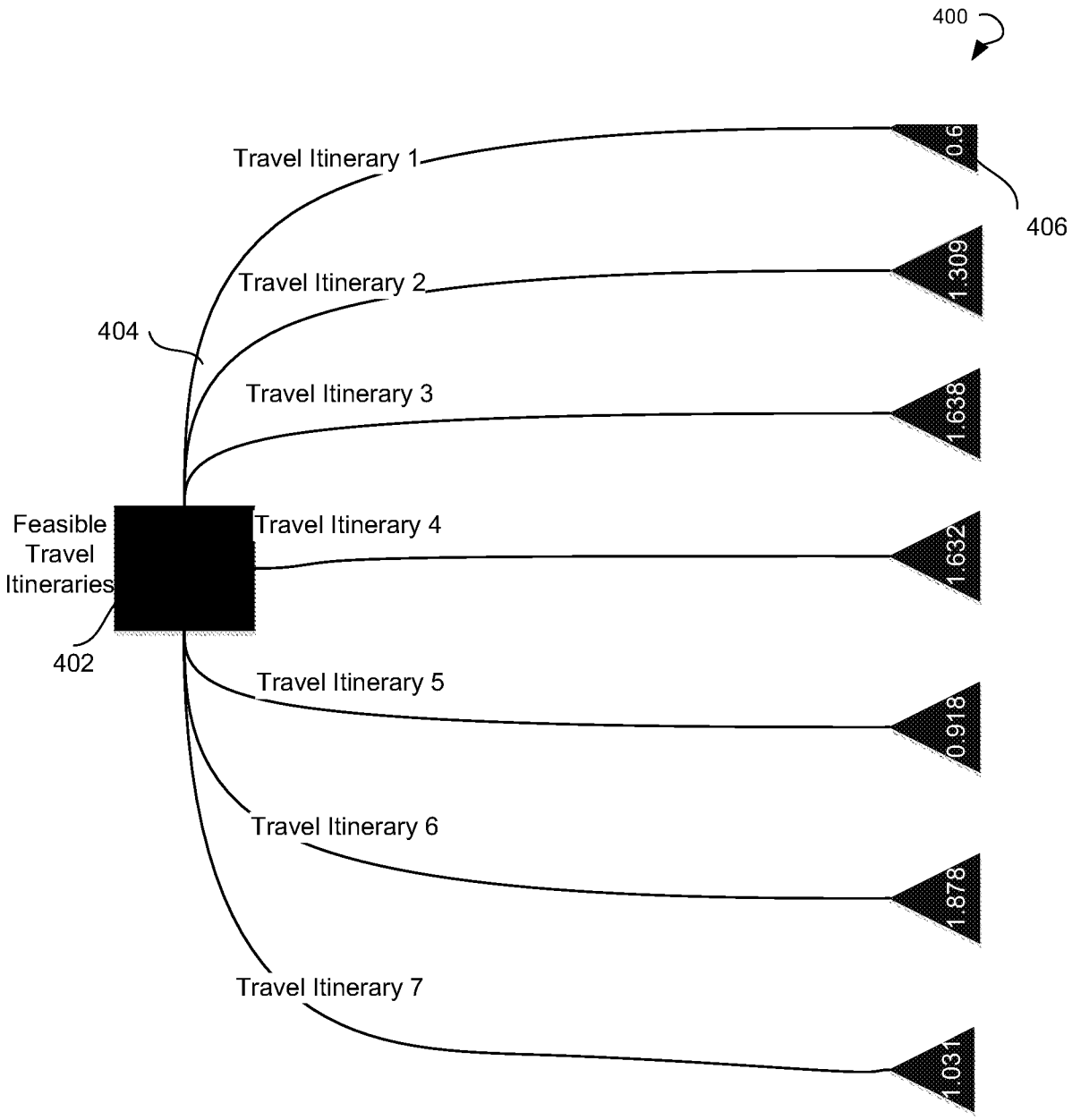

400
Travel Itinerary 1
0.6
406
Travel Itinerary 2
1.309
404
Travel Itinerary 3
1.638
Feasible Travel Itineraries
Travel Itinerary 4
1.632
402
Travel Itinerary 5
0.918
Travel Itinerary 6
1.878
Travel Itinerary 7
1.031

FIG. 4

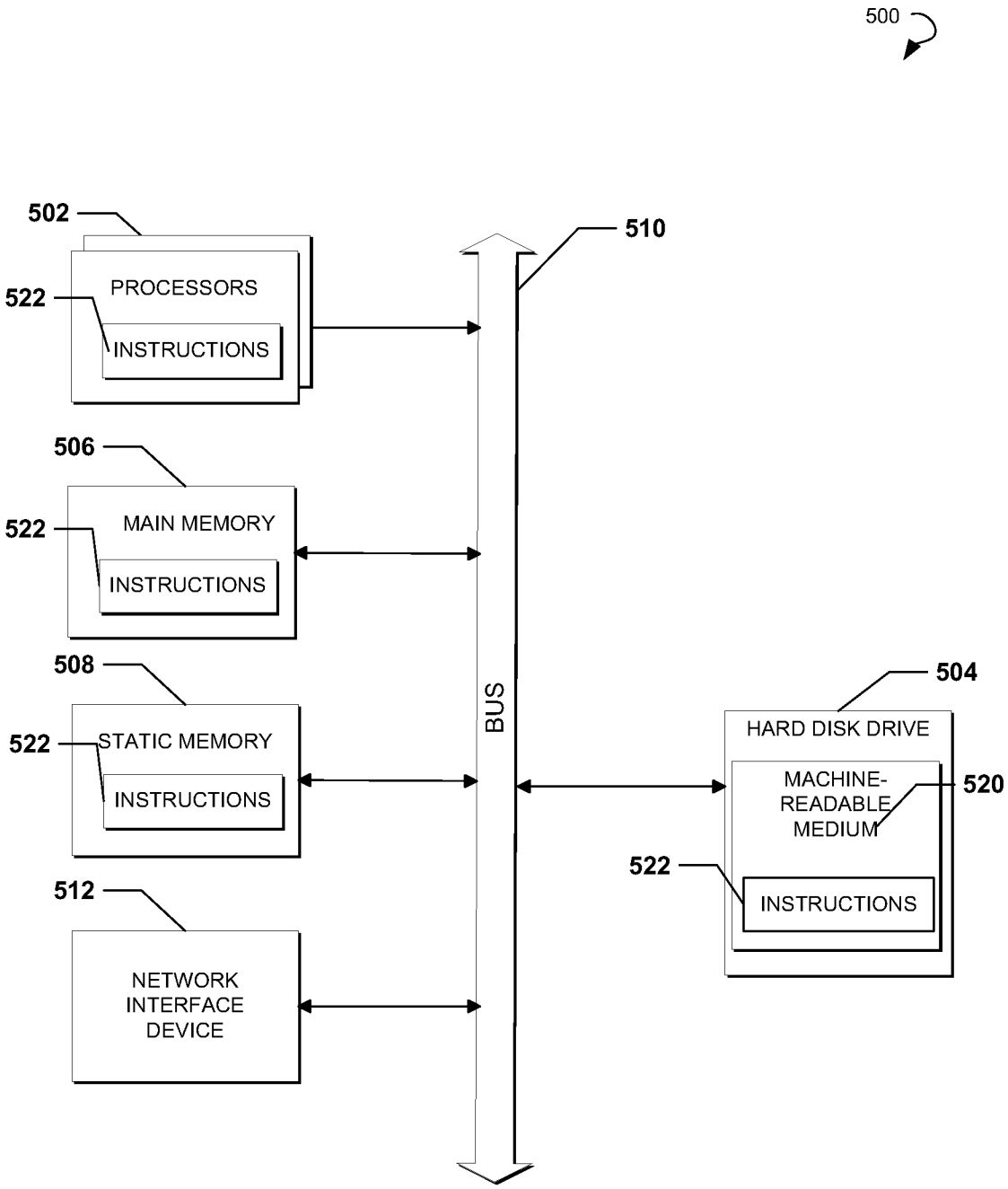
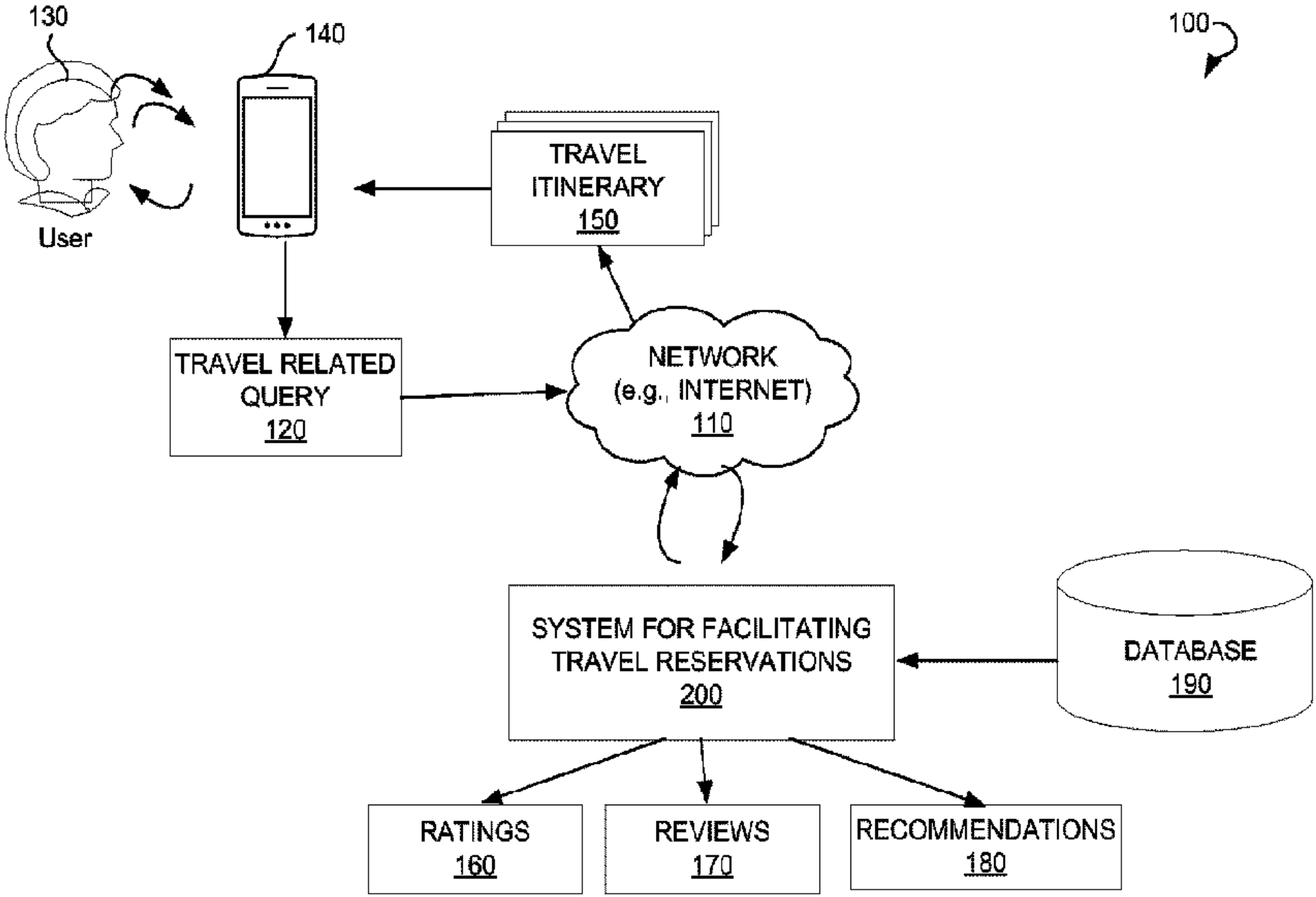

500
502
PROCESSORS
522
INSTRUCTIONS
510
506
MAIN MEMORY
522
INSTRUCTIONS
508
STATIC MEMORY
522
INSTRUCTIONS
BUS
504
HARD DISK DRIVE
MACHINE-READABLE MEDIUM
520
522
INSTRUCTIONS
512
NETWORK INTERFACE DEVICE

FIG. 5


130
140
100
User
TRAVEL ITINERARY 150
TRAVEL RELATED QUERY 120
NETWORK (e.g., INTERNET) 110
SYSTEM FOR FACILITATING TRAVEL RESERVATIONS 200
DATABASE 190
RATINGS 160
REVIEWS 170
RECOMMENDATIONS 180