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(54) Title: RESOURCE-BASED SERVICE PROVIDER SELECTION AND AUTO COMPLETION

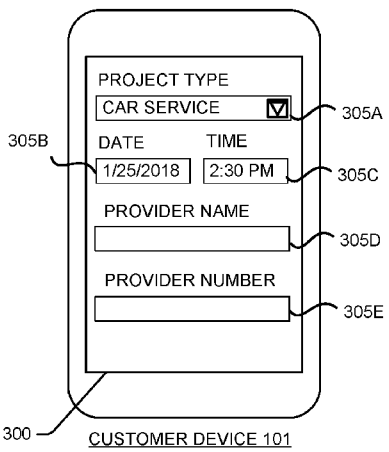

FIGURE 3A

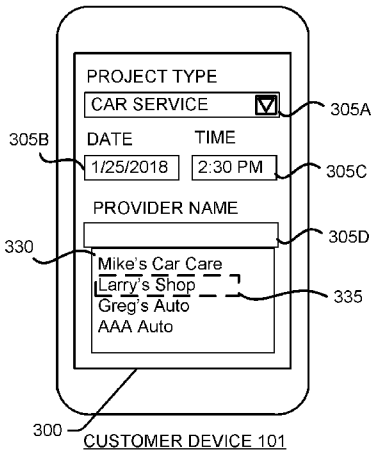

FIGURE 3B

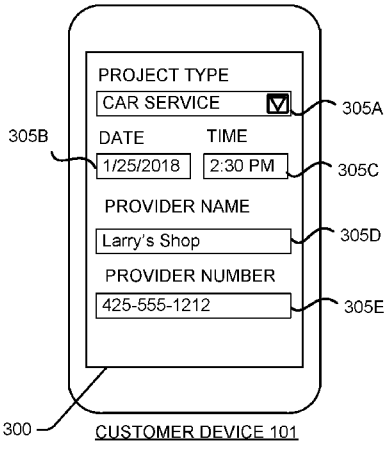

FIGURE 3C

(57) Abstract: Techniques described herein provide resource-based auto completion for data entry fields of a graphical user interface. In some configurations, the techniques disclosed herein utilize input data and contextual data from a number of resources to select and display text entry candidates for assisting users in populating one or more data entry fields. For example, the input data can include an indication of a service category or a topic and other data defining a calendar event. The contextual data can be related to service providers and customers including, data defining a prior work history between two or more entities, commute projections, scheduling conflicts, preferences, and other data, such as traffic data and weather data. Data indicating a lifetime value of a customer or provider can also be utilized to select text entry candidates.

WO 2017/189341 A1

[Continued on next page]

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RESOURCE-BASED SERVICE PROVIDER SELECTION AND AUTO COMPLETION

BACKGROUND

[0001] Line completion and text entry prediction technologies have been part of the computer industry for some time. In some existing systems, a computing device can identify and display word candidates to a user in response to an initial text entry. As the user enters characters into a text entry field, the system can identify word candidates based on the entered characters and display a word candidate or a list of word candidates to the user for selection. In response to receiving a selection of a word candidate, the computing device can populate the text entry field with the selected word.

[0002] Although some existing systems are useful for some applications, current technologies have a number of limitations. Some technologies only select word candidates based on previously typed word combinations. For example, if a user has previously entered a home address into a device, the device may later present the street name as a word candidate when the user enters the street address. Such technologies leave much to be desired with respect to a user experience, as word candidates are not often relevant, and less so in dynamic environments.

[0003] It is with respect to these and other considerations that the disclosure made herein is presented.

SUMMARY

[0004] Techniques described herein provide resource-based auto completion for data entry fields of a graphical user interface. In some configurations, the techniques disclosed herein utilize input data and contextual data from a number of resources to identify and display text entry candidates for assisting users in populating one or more data entry fields. For example, the input data can include an indication of a service category or a topic, e.g., auto repair, lawn care, legal services, etc. The input data can also define aspects of a calendar event, such as a date and time. The contextual data can be related to service providers and customers including, but not limited to, data defining a prior work history between two or more entities, commute projections, scheduling conflicts, payment histories, credit histories, an availability of one or more parties, a location of a project, travel time to an appointment, preferred business hours, the availability of one or more entities, performance metrics, customer preferences, vendor preferences, workflow definitions, and combinations thereof. The contextual data can also include traffic data, weather data, and other data that can impact a schedule and/or a

commute of a service provider or consumer. The techniques disclosed herein can also utilize data that quantifies a value of a customer or a value of a vendor.

[0005] In some configurations, the input data, contextual data, and other data, can be used to generate a ranked list of items, which can include a ranked list of providers or a ranked list of customers. A selection of an item of the list causes the retrieval of metadata related to the selected item. The metadata, which can include a company name, a person's name, contact information, location data, and other data, can be displayed as text entry candidates for one or more data entry fields of a graphical user interface. The techniques disclosed herein assist users with their interaction with a computing device, which among other benefits, saves computing resources and reduce the number of inadvertent user entries. In addition, the techniques disclosed herein enable customers to identify one or more providers that helps them achieve one or more goals. Yet further, the techniques disclosed herein enable providers to identify one or more customers that helps them achieve one or more goals.

[0006] In some configurations, the techniques disclosed herein involve the generation of data defining a level of eligibility for providers and customers. For example, if a customer desires to schedule an appointment pertaining to a particular service category, contextual data is analyzed to determine a level of eligibility for a number of providers. A level of eligibility for individual providers can be adjusted based on a provider's specialization, schedule, workload, prior work history, ability to commute to a particular location, and/or a combination of such data and other contextual data. Similarly, a level of eligibility for one or more customers can be determined based on contextual data from a number of resources. The level of eligibility can be used to influence a ranking of a provider or a customer on a ranked list of items.

[0007] In some configurations, customer preferences and provider preferences can be used to influence a ranking of a provider or a customer on a ranked list of items. For instance, customer preferences can define one or more priorities, which may include cost savings, work quality, etc. The preferences can be analyzed with other contextual data, such as work history data defining performance history data and billing data. The ranking of a provider can be adjusted based, at least in part, on an analysis of contextual data associated with the provider in view of the customer's preferences. In addition, the techniques can use such data to take other actions, e.g., automatically select providers for termination, automatically select providers for promotions, etc.

[0008] In another example, provider preferences can define one or more priorities, which may include a desire to obtain high-volume customers, high-profile customers, and/or customers having a threshold credit score. Combinations of priorities enable service providers to identify customers having a "lifetime value" that meet or exceed a threshold. The ranking of a customer can be adjusted based, at least in part, on an analysis of contextual data associated with the customer in view of the provider's preferences. In addition, the techniques can use such data to take other actions, e.g., automatically select customers for termination, automatically select customers for special pricing, etc.

[0009] It should be appreciated that the above-described subject matter may also be implemented as a computer-controlled apparatus, a computer process, a computing system, or as an article of manufacture such as a computer-readable medium. These and various other features will be apparent from a reading of the following Detailed Description and a review of the associated drawings. This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description.

[0010] This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended that this Summary be used to limit the scope of the claimed subject matter. Furthermore, the claimed subject matter is not limited to implementations that solve any or all disadvantages noted in any part of this disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The Detailed Description is described with reference to the accompanying figures. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same reference numbers in different figures indicates similar or identical items.

[0012] FIGURE 1 is a block diagram showing an illustrative system for enabling resource-based auto completion for data entry fields.

[0013] FIGURES 2A-2E include screen diagrams showing an illustrative graphical user interface that is configured with graphical elements for receiving input data and data entry fields that are configured to be populated with metadata.

[0014] FIGURES 3A-3C include screen diagrams showing an illustrative graphical user interface that is configured to receive data for a calendar event, the user interface including data entry fields that are configured to be populated with metadata.

[0015] FIGURE 4 is a flow diagram showing a routine illustrating aspects of a mechanism disclosed herein for enabling resource-based auto completion for data entry fields.

[0016] FIGURE 5 is a computer architecture diagram illustrating an illustrative computer hardware and software architecture for a computing system capable of implementing aspects of the techniques and technologies presented herein.

[0017] FIGURE 6 is a diagram illustrating a distributed computing environment capable of implementing aspects of the techniques and technologies presented herein.

[0018] FIGURE 7 is a computer architecture diagram illustrating a computing device architecture for a computing device capable of implementing aspects of the techniques and technologies presented herein.

DETAILED DESCRIPTION

[0019] The following Detailed Description describes technologies enabling resource-based auto completion for data entry fields. In some configurations, the techniques disclosed herein utilize input data and contextual data from a number of resources to identify and display text entry candidates for assisting users in populating one or more data entry fields. For example, the input data can include an indication of a service category or a topic, e.g., auto repair, lawn care, legal services, etc. The input data can also define aspects of a calendar event, such as a date and time. The contextual data can be related to service providers and customers including, but not limited to, data defining a prior work history between two or more entities, commute projections, scheduling conflicts, payment histories, credit histories, an availability of one or more parties, a location of a project, travel time to an appointment, preferred business hours, the availability of one or more entities, performance metrics, customer preferences, vendor preferences, workflow definitions, and combinations thereof. The contextual data can also include traffic data, weather data, and other data that can impact a schedule and/or a commute of a service provider or consumer. The techniques disclosed herein can also utilize data that quantifies a value of a customer or a value of a vendor.

[0020] In some configurations, the input data, contextual data, and other data, can be used to generate a ranked list of items, which can include a ranked list of providers or a ranked list of customers. A selection of an item of the list causes the retrieval of metadata related to the selected item. The metadata, which can include a company name, contact information, location data, and other data, can be displayed as text entry candidates for one or more data entry fields of a graphical user interface.

[0021] By the use of the technologies described herein, contextual data from a number of resources can be utilized to enable resource-based auto completion for data entry fields of a user interface. Such technologies can improve user interaction with a computing device by automatically suggesting words or other data that are contextually relevant to a relationship between two or more parties. Configurations can be beneficial in assisting users coordinating aspects of a project, such as calendar events, particularly when a user has a large number of events to schedule. Among many benefits provided by the technologies described herein, a user's interaction with a device may be improved, which may reduce the number of inadvertent inputs, reduce the consumption of processing resources, and mitigate the use of network resources. Other technical effects other than those mentioned herein can also be realized from implementations of the technologies disclosed herein.

[0022] It should be appreciated that the above-described subject matter may be implemented as a computer-controlled apparatus, a computer process, a computing system, or as an article of manufacture such as a computer-readable storage medium. These and various other features will be apparent from a reading of the following Detailed Description and a review of the associated drawings. Furthermore, the claimed subject matter is not limited to implementations that solve any or all disadvantages noted in any part of this disclosure.

[0023] As will be described in more detail herein, it can be appreciated that implementations of the techniques and technologies described herein may include the use of solid state circuits, digital logic circuits, computer component, and/or software executing on one or more devices. Signals described herein may include analog and/or digital signals for communicating a changed state, movement and/or any data associated with motion detection. Gestures captured by users of the computing devices can use any type of sensor or input device.

[0024] While the subject matter described herein is presented in the general context of program modules that execute in conjunction with the execution of an operating system and application programs on a computer system, those skilled in the art will recognize that other implementations may be performed in combination with other types of program modules. Generally, program modules include routines, programs, components, data structures, and other types of structures that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the subject matter described herein may be practiced with other computer system

configurations, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers, and the like.

[0025] In the following Detailed Description, references are made to the accompanying drawings that form a part hereof, and in which are shown by way of illustration specific configurations or examples. Referring now to the drawings, in which like numerals represent like elements throughout the several figures, aspects of a computing system, computer-readable storage medium, and computer-implemented methodologies for providing resource-based auto completion for data entry fields of a graphical user interface. As will be described in more detail below with respect to FIGURES 5-7, there are a number of applications and services that can embody the functionality and techniques described herein.

[0026] FIGURE 1 is a block diagram showing aspects of one example environment 100, also referred to herein as a "system 100," disclosed herein for providing resource-based auto completion for data entry fields. In one illustrative example, the example environment 100 can include one or more servers 120, one or more networks 150, one or more customer devices 101A-101B (collectively "customer devices 101"), one or more provider devices 104A-104D (collectively "provider devices 104"), and one or more resources 106A-106E (collectively "resources 106"). The customer devices 101 can be utilized for interaction with one or more customers 103A-103B (collectively "customers 103"), and the provider devices 104 can be utilized for interaction with one or more service providers 105A-105D (collectively "service providers 105"). This example is provided for illustrative purposes and is not to be construed as limiting. It can be appreciated that the example environment 100 can include any number of devices, customers, providers, and/or any number of servers 120.

[0027] For illustrative purposes, the service providers 105 can be a company, person, or any type of entity capable of providing services or products for the customers 103, which can also be a company, person or other entity. For illustrative purposes, the service providers 105 and the customers 103 can be generically and individually referred to herein as "users." In general, the techniques disclosed herein enable users to utilize contextual data from a number of resources 106 to identify relevant metadata 140 that can be used to complete one or more data entry fields of a graphical user interface. In addition, the techniques disclosed herein enable customers 103 to identify one or more providers 105 that helps them achieve one or more goals. Yet further, the techniques disclosed herein

enable providers 105 to identify one or more customers 103 that helps them achieve one or more goals.

[0028] The customer devices 101, provider devices 104, servers 120 and/or any other computer configured with the features disclosed herein can be interconnected through one or more local and/or wide area networks, such as the network 150. In addition, the computing devices can communicate using any technology, such as BLUETOOTH, WIFI, WIFI DIRECT, NFC or any other suitable technology, which may include light-based, wired, or wireless technologies. It should be appreciated that many more types of connections may be utilized than described herein.

[0029] A customer device 101 or a provider device 104 (collectively "computing devices") can operate as a stand-alone device, or such devices can operate in conjunction with other computers, such as the one or more servers 120. Individual computing devices can be in the form of a personal computer, mobile phone, tablet, wearable computer, including a head-mounted display (HMD) or watch, or any other computing device having components for interacting with one or more users and/or remote computers. In one illustrative example, the customer device 101 and the provider device 104 can include a local memory 180, also referred to herein as a "computer-readable storage medium," configured to store data, such as a client module 102 and other contextual data described herein.

[0030] The servers 120 may be in the form of a personal computer, server farm, large-scale system or any other computing system having components for processing, coordinating, collecting, storing, and/or communicating data between one or more computing device. In one illustrative example, the servers 120 can include a local memory 180, also referred to herein as a "computer-readable storage medium," configured to store data, such as a server module 121 and other data described herein. The servers 120 can also include components and services, such as the application services and shown in FIGURE 6, for providing, receiving, and processing contextual data and executing one or more aspects of the techniques described herein. As will be described in more detail herein, any suitable module may operate in conjunction with other modules or devices to implement aspects of the techniques disclosed herein.

[0031] The system 100 may include a number of resources, such as a traffic data resource 106A, map data resource 106B, search engine resource 106C, specialty data resource 106D, and a weather data resource 106E (collectively referred to herein as "resources 106"). The resources 106 can be a part of the servers 120 or separate from the

servers 120, and the resources 106 can provide contextual data, including traffic data 124, location data 125, specialty data 126, map data 127, workflow data 128, preference data 129, payment data 130, scheduling data 131, workload data 132, work history data 133, status data 134, skill set data 135, weather data 136, and other data described herein. As will be described in more detail below, the contextual data can be utilized to identify metadata 140 related to the customers 103 and providers 105. The metadata 140 can include, but is not limited to, a person's name, a company name, contact information, location data, and any other data related to a provider 105 or a customer 103. In some configurations, the metadata 140 can include any format suitable for populating one or more data entry fields of a user interface.

[0032] These example resources 106 and contextual data are provided for illustrative purposes and are not to be construed as limiting. It can be appreciated that the techniques disclosed herein may utilize more or fewer resources 106 shown in FIGURE 1. It can also be appreciated that some of the resources shown in FIGURE 1 can obtain any type of contextual information from other resources such as social networks, e-commerce systems, government systems, and other like sources. For instance, sales data from e-commerce systems can be used to determine a performance indicator of a customer or a provider.

[0033] The scheduling data 131 can define appointments for the customers 103 and the providers 105. The scheduling data 131 can define a start time and an end time. The scheduling data 131 can also include location data 125 if an appointment is associated with a geographic location, global coordinates, an address, a room number and other information identifying a location. The scheduling data 131 can define a single appointment or a series of appointments. In addition, the scheduling data 131 can include communication information such as a phone number, IM address, URL, or other information for facilitating a voice or video conference. The scheduling data 131 can also include a text description of an appointment and other data indicating a topic, service category, a customer 103 and/or a provider 105. The scheduling data 131 can be stored on the server 120, customer device 101, provider device 104, or any suitable computing device, which may include a Web-based service.

[0034] The map data 127 can define roads and other types of travel paths within a geographic area. The map data 127 can also include topography data and other data that may influence a commute of a user from one location to another. The map data 127 can also include data defining buildings, homes, and other landmarks. The map data 127 can

also include image data which may include a satellite image of the roads and paths within a geographic area as well as images of buildings, homes and other landmarks. The map data 127 may be from a number of resources, including a web-based service, government services, or other resources.

[0035] The traffic data 124 can include real-time updates on vehicle traffic within a geographic area. The traffic data 124 can also include historical travel data that can be used to predict travel times between two or more locations. The traffic data 124 can be in any suitable format for defining projected travel times between two or more locations that considers a time of travel, weather at a time of travel, traffic at a time of travel, and other factors that may influence a projected travel time. The traffic data 124 may be from a number of resources, including a web-based service, government services, or other resources.

[0036] The weather data 136 can include current, historical, and forecast data indicating weather conditions. The weather data 136 can include data with respect to wind, precipitation, temperature and other conditions that may influence a commute from one location to another. The weather data 136 can be in any suitable format for enabling the projection of travel times between two or more locations. The weather data 136 may be from a number of resources, including a web-based service, government services, or other resources.

[0037] The specialty data 126 can include information pertaining to a specialization, subject, topic, one or more industries, or an area of interest. For example, specialty data 126 may include details relating to a medical topic, such as pediatrics, dentistry, etc. In other examples, the specialty data 126 may relate to diseases, cures, conditions, and other like topics. The specialty data 126 can be obtained from a number of different resources including web-based resources such as sites provided by WebMD, the American Medical Association, and the Center of Disease Control. These examples are provided for illustrative purposes and are not to be construed as limiting, as the specialty data 126 can be related to any topic or areas of interest.

[0038] The workflow data 128 can define a multi-step process and attribute definitions within each step of the process. The workflow data 128 can be obtained from a number of different resources including web-based resources. In addition, the workflow data 128 can be derived from other data such as the specialty data 126. For example, specialty data 126 that pertains to pediatrics can be analyzed to determine a process that

involves a number of steps which may include immunization shots, follow-up exams, and other milestones and tasks that are recommended at certain times.

[0039] The workload data 132 may include a listing of a number of services, projects, or appointments that are scheduled for a provider. For example, the workload data 132 may list a number of projects that are currently scheduled for a company. The workload data 132 can also be based on scheduling data 131, such as a number of appointments that are scheduled for a doctor. The workload data 131 can also define one or more thresholds. Such data can be used to determine if a company or individual is at, below, or above a given capacity. In some configurations, the workload data 132 defines a value indicating an ability of the individual provider relative to a predetermined workload capacity.

[0040] The skill set data 135 identifies and quantifies a range of skills and/or abilities of a particular company or individual. The skill set data 135 may include a hierarchy of data that identifies an industry, specializations within an industry, and details with respect to these specific projects that have been performed in the past. For instance, the skill set data 135 may identify a company as a construction company capable of performing particular types of renovations. The skill set data 135 may also provide details with respect to particular renovation projects and specialized features related to those projects. The skill set data 135 can apply to any company or individual related to any industry.

[0041] The work history data 133 can include performance indicators related to a provider 105 or a customer 103. For instance, the work history data 133 can indicate the quality of one or more projects performed by a provider 105. Work history data 133 can include an array of different performance indicators, which may relate to timeliness, productivity, accuracy, price, other indicators and combinations thereof. In other examples, the work history data 133 can indicate performance indicators associated with customers 103. In such examples, a customer 103 can be associated with an array of different performance indicators which may relate to a credit score or any other score associated with the behavior of a company, an individual or a group of individuals.

[0042] The payment data 130 can include a record of payments that are made between two or more parties. The payment data 130 can also include data indicating the timeliness in which payments are made. The payment data 130 can include a credit score or any other data that indicates a reliability and/or ability to make timely payments.

[0043] The status data 134 can define the availability of one or more parties. For instance, status data 134 can indicate if a party is unavailable, available, or unavailable until a particular date. The status data 134 can also define a level of availability. These examples are provided for illustrative purposes and are not to be construed as limiting. It can be appreciated that the status data 134 include a form of data indicating the availability of a company, an individual or a group of individuals.

[0044] The preference data 129 can include customer-defined preferences or provider-defined preferences. In some configurations, the preference data 129 can include a number of weighted parameters that indicate priorities, preferences, and/or goals. For instance, a provider 105 may indicate that they are interested in identifying customers that are timely with respect to appointments. In other examples, a provider 105 may indicate that they are interested in customers having good credit or customers that may have a particular payment history. In some configurations, provider-defined preferences can include a combination of parameters and/or priorities enabling the system 100 to identify, select, and rank customers having a long-term value or a short-term value to a provider. In one illustrative example, provider-defined preferences may identify a number of performance metrics with respect to customers and each performance metric can be weighted to enable a provider 105 to identify customers having a "high lifetime value." Such preferences can be configured for providers desiring to acquire customers that can benefit their company with respect to long-term goals. The preference data 129 can include provider-defined preferences enabling the system 100 to identify, select, and rank high-volume customers, high-profile customers, and other types of customers or users that fit one or more business models. In addition to identifying preferred customers, the techniques disclosed herein can also enable a provider to "fire," e.g., terminate, unwanted customers.

[0045] At the same time, the preference data 129 can help customers identify and/or terminate providers. In some configurations, customer-defined preferences may indicate they are interested in identifying providers 105 having a particular quality rating. The preference data 129 can also include other data to indicate a combination of parameters, goals, and/or priorities. For instance, the preference data 129 can include customer-defined preferences enabling the system 100 to identify, select, and rank high-volume providers, high-profile providers, and other types of providers that meet the needs of a customer.

[0046] The preference data 129 can also define a value indicating a level of "interruptability" of a particular project, job, appointment, or event. As will be described in the examples provided herein, a customer 103 or a provider 105 can indicate if a particular calendar event can be interrupted by other calendar event proposals. Such features enable the techniques disclosed herein to resolve conflicts between calendar events and identify alternative plans if conflicts arise.

[0047] It can be appreciated that a level of interruptability, priority or other preferences for a calendar event can be from a number of sources. For instance, a priority or a level of interruptability can be communicated when a calendar event is created. In some configurations, a priority for a calendar event can be based on a priority indicated by a sender of a calendar event. In such an example, a user entering input data can indicate a priority or a level of interruptability. In addition, a priority for a calendar event can be based on a priority established by a recipient of the calendar event. In such an example, a recipient may accept an invitation for an appointment and provide input data indicating a priority and/or a level of interruptability. A priority and/or a level of interruptability can also be a combination of inputs from the sender and recipient of a calendar event.

[0048] As summarized above, the techniques disclosed herein utilizes contextual information from a number of different resources to provide text entry candidates for populating data entry fields of a graphical user interface. In some configurations, a method includes obtaining metadata 140 associated with one or more providers 105. The metadata 140 related to the providers 105 can include a company name, contact information, location data, and other related data. The method also includes obtaining contextual data associated with one or more providers and/or contextual data associated with one or more consumers. For example, the contextual data can define a work history associated with the providers. The work history associated with the provider can indicate performance data with respect to one or more customers.

[0049] When a customer 103, e.g., a customer, desires to schedule an appointment or complete a form, the customer can provide some initial input data through a graphical user interface. The graphical user interface may include data entry fields, pulldown menus, and other graphical elements that enable a user to provide input data. The information provided by the customer may be entered through voice commands, gestures, text-based messages and other means of communication. In one illustrative example, the customer may provide input data indicating a project type, which may include an indication of a specialization such as lawn care, legal services, auto repair, etc. The customer may also

provide input data indicating a desired time of an appointment, event, or series of events. The customer may also provide input data indicating a desired location of an appointment. The techniques disclosed herein can also analyze the preference data 129 of the customer and/or one or more providers to determine goals, objectives, and/or other preferences.

[0050] The techniques disclosed herein can analyze the input data and contextual data to identify one or more providers 105. In some configurations, the providers 105 can be ranked based on an analysis of the input data and contextual information, including preference data. In one example, scheduling data 131 associated with one or more providers 105 and customers 103 can be analyzed to determine if there are scheduling conflicts. The ranking of a particular provider 105 can also be influenced by a severity of a scheduling conflict. For instance, if a first provider has a scheduling conflict that completely overlaps with an appointment defined by the input data, the ranking of the first provider may be lower than another provider having a scheduling conflict that does not completely overlap with the appointment defined by the input data.

[0051] Techniques disclosed herein can cause the generation of data indicating a severity of a conflict. Such a quantification can be based on a number of factors, including scheduling data of two or more entities, a probability of a commute between two or more appointments, and other factors that can be used to determine that a meeting is improbable or probable. Data indicating a severity of a conflict can also be based on factors indicating that scheduling conflict is irreconcilable or reconcilable.

[0052] In addition, location data 125 can be analyzed to determine if providers 105 and/or the customers 103 have a threshold probability with respect to commuting to a desired location. A probability of a commute can be generated by the use of map data, weather data, traffic data, and other data. A ranking of a particular provider 105 can be influenced by the probability of the commute. For example, a first provider having a high probability of a successful commute to a desired location may be ranked higher than a second provider having a low probability of a successful commute to the desired location.

[0053] Work history data 133 can also be analyzed to determine a performance level of a particular provider 105. For instance, some providers may have high quality ratings with respect to past projects. Such providers may have a higher ranking than providers having low quality ratings.

[0054] In addition, skill set data 135 can be analyzed to determine if a particular provider is appropriate for the appointment. Candidate providers can be selected and/or ranked for a list based on the analysis of such data. For instance, if the input data indicates

an interest in medical services, a provider having a skill set in the medical field can rank higher than a provider having a skill set in the automotive field. In some configurations, providers may be selected for a list based on one or more thresholds. Preference data may also define one or more metrics and/or thresholds that may influence a ranking of a particular provider on the list.

[0055] The list of candidate providers can be displayed on a graphical user interface. At least one candidate provider can be selected by a user or automatically selected by a computing device based on criteria or goals, which can be defined in the preference data 129. In response to the selection of at least one provider, metadata 140 associated with the selected provider can be populated and displayed in data entry fields of the graphical user interface. These examples are provided for illustrative purposes and are not to be construed as limiting, it can be appreciated that other types of input data and contextual data can be obtained for analysis and processing as described herein. The following examples illustrate how contextual data, input data and other data can be used in other scenarios to enable resource-based auto completion for data entry fields.

[0056] Turning now to FIGURES 2A-2E, an example graphical user interface (UI) is configured to display and receive data relating to the techniques disclosed herein. The example UI can be displayed to a user desiring to complete a form having data entry fields. The screen diagrams presented are for illustrative purposes only, and are not intended to be limiting. Although the following examples include project-related or calendar-related interfaces, it can be appreciated that techniques disclosed herein can be applied to any user interface having data entry fields. It can also be appreciated that the examples disclosed herein can apply to any type of user, e.g., a customer 103 or a provider 105.

[0057] FIGURE 2A is a screen diagram showing an illustrative graphical UI 200 that displays data relating to techniques for enabling resource-based auto completion for data entry fields. The UI 200 may be generated by client module 102, shown in FIGURE 1, and presented on a computing device, such as a customer device 101 or a provider device 104.

[0058] As illustrated in FIGURE 2A, the UI 200 includes a display of a number of graphical elements for receiving and displaying data. In this example, the UI 200 includes a “project type” UI element 205A for receiving input data indicating a specialization, a “provider name” UI element 205B for receiving data specifying the name of a provider

105, a "provider number" UI element 205C for receiving data specifying a phone number associated with the provider listed in the provider name UI element 205B.

[0059] As illustrated in FIGURE 2B, the "project type" UI element 205A is a pulldown menu having a number of items. In this example, a user can provide input data by the selection of at least one item of the pull down menu 210. For illustrative purposes, the pulldown menu 210 includes: "Lawn Service," "Salon Service," "Car Service" and "Repair Service." This example is provided for illustrative purposes not to be construed as limiting. It can be appreciated that other categories can be listed and any other type of graphical element may be utilized by the techniques disclosed herein to receive input data, which may include a text entry field or another graphical element configured to receive input data or initiate the receipt of a voice input.

[0060] As shown in FIGURE 2C, for illustrative purposes, the "Car Service" menu item 215 is selected. In response to receiving the input data indicating a selection of a service category, the client module 102 of the customer device 101 can communicate the input data to the server 120 for processing. Based on the input data, the server 120 and/or the customer device 101 can analyze a database of providers. The database can include a data related to providers having specializations in one or more categories. Providers that have specializations that match the selected service category indicated in the input data can be selected and/or ranked in a list of providers.

[0061] The selection and/or ranking of individual providers can be based on a number of factors. For instance, the ranking of each provider may be based on contextual data, input data, and/or preference data 129. As summarized above, in some configurations, a selection and/or ranking of an individual provider can be based on a level of eligibility. The level of eligibility can be based on an analysis of contextual data, such as a provider's specialization, workload, prior work history, ability to commute to a particular location, and/or a combination of such data and other contextual data. The contextual data can also include map data, traffic data, weather data, and other contextual data that can be used to determine a level of eligibility for individual provider.

[0062] In some configurations, preferences of the customer and/or preferences of providers can be analyzed. For instance, preference data can define one or more customer-defined goals, which may include cost savings goals, work quality goals, time saving goals, etc. The preference data can be analyzed with other contextual data, such as work history data defining performance history data and/or billing data of a provider. The ranking of an individual provider can be adjusted based, at least in part, on an analysis of

the preference data and the contextual data associated with the provider. For instance, if customer-defined preferences indicate work quality as a priority, individual providers having high quality ratings can rank higher than providers having low quality ratings.

[0063] In addition, techniques disclosed herein can analyze location data 125 and other data to rank one or more providers. For instance, providers associated with a location that is close to the customer's home or office may be ranked higher than providers that are located at a further distance. Traffic data 124 and other data may also be analyzed to determine the ranking of each provider. For instance, a provider having a commute that is not impacted by traffic may rank higher than a provider having a commute that is impacted by traffic. Additional details and examples of such configurations and other configurations for ranking providers on a list are provided in more detail below.

[0064] FIGURE 2D illustrates one example of a ranked list 220 of providers. In this example a number of providers are listed: Mike's Car Care, Larry's Shop, Greg's Auto, and AAA auto. In this example, the ranked list 220 is displayed below the provider name UI element 205B. The ranked list can be configured to receive a selection of one provider of the list. For illustrative purposes, the second provider 225 on the list 220, Larry's Shop, is selected by a user.

[0065] In accordance with the techniques disclosed herein, based on the selection of at least one provider of the list, metadata 140 related to the selected provider is obtained from one or more resources. The metadata 140 can be obtained from a number of locations, such as an address book, directory, or any other suitable resource, such as a search engine 106C. Among other examples disclosed herein, the map data resource 106B can be accessed to obtain location information and other metadata 140 for populating data entry fields of the UI 200.

[0066] FIGURE 2E shows an illustrative example of a data entry field, e.g., the provider number UI element 205C, populated with metadata 140 associated with the selected provider. In this illustrative example, the metadata 140 includes a phone number associated with the selected provider. This example is provided for illustrative purposes and is not to be construed as limiting. It can be appreciated that other metadata 140 can be obtained and used to populate one or more data entry fields.

[0067] It can also be appreciated that one or more data entry fields can be populated without a user selection of a menu item. For instance, the preference data can indicate rules or other criteria that enables an automatic selection of items on a list. In some configurations, such rules or criteria may enable a computing device to

automatically select one or more items based, at least in part, on a level of eligibility and/or analysis of contextual data.

[0068] Turning now to FIGURES 3A-3C, another example UI is configured to display and receive data relating to the techniques disclosed herein. This example UI can be displayed to a user desiring to complete a form of data entry fields for scheduling an appointment. The screen diagrams presented are for illustrative purposes only and are not intended to be limiting. It can be appreciated that the techniques disclosed herein can apply to UI configurations for displaying and receiving other types of input data.

[0069] As illustrated in FIGURE 3A, the UI 300 includes a display of a number of graphical elements for receiving data related to an appointment. In this example, the UI 300 includes a "project type" UI element 305A for receiving input data indicating a specialization or topic, a "date" UI element 305B for receiving a preferred appointment date, a "time" UI element 305C for receiving a preferred appointment time, a "provider name" UI element 305D for receiving data specifying a name of at least one provider 105, a "provider number" UI element 305E for receiving data specifying a phone number associated with a provider listed in the provider name UI element 305D.

[0070] Similar to the prior example, the user can provide input data by selecting a project type utilizing the "project type" UI element 305A. In this example, for illustrative purposes, the "Car Service" menu item is selected. In addition, input data indicating a preferred date is provided utilizing the "date" UI element 305B and input data indicating a preferred time is provided utilizing the "time" UI element 305C.

[0071] In response to receiving the input data, the client module 102 of the customer device 101 can process the input data and/or communicate the input data to the server 120 for processing. Similar to the example above, one or more providers may be selected from a database of providers based on the selected service category indicated by the input data.

[0072] The selected providers may be selected and/or ranked based on a number of factors. In some configurations, providers can be selected and/or ranked based on an analysis of contextual data, such as data defining a prior work history between two or more entities, payment histories, credit histories, an availability of one or more parties, a location of a project, travel time to an appointment, traffic data, skill set data, preferred business hours, scheduling availability, performance metrics, scheduling conflicts, customer preferences, vendor preferences, workflow definitions, other data, and combinations thereof.

[0073] In addition, contextual data can be analyzed in view of one or more preferences, such as consumer-defined preferences and/or provider-defined preferences. Such an analysis may involve a user's preference data, which may include goals related to cost savings, time savings, and/or work quality. In addition, the analysis may involve preference data defined by one or more providers, which may include goals of obtaining customers in one or more segments. For instance, provider-defined preferences may define goals for obtaining high-volume clients or high-value clients, such as clients having a lifetime value to one or more aspects of a business. The ranking and/or selection of an individual provider can be influenced depending on the alignment between the contextual data and preference data.

[0074] In some configurations, the analysis of scheduling data 131 can influence a selection and/or ranking of one or more providers. For instance, the techniques disclosed herein can identify one or more providers that is available at the desired date and time indicated in the input data. If one or more providers are available during the desired date and time indicated in the input data, such providers may be selected and/or ranked in the ranked list of providers. A provider having an open schedule may be ranked higher than a provider having a conflict.

[0075] In addition, the severity of a conflict may influence the ranking and/or selection of a particular provider. As summarized above, the techniques disclosed herein can cause the generation of data indicating a severity of a conflict. Such a quantification can be based on a number of factors, including scheduling data of two or more entities, a probability of a commute between two or more appointments, and other factors that can be used to determine that a meeting is improbable or probable. Data indicating a severity of a conflict can also be based on factors indicating that scheduling conflict is irreconcilable or reconcilable. Data indicating a severity of a conflict can also be based on a priority or a degree of interruptability with respect to a particular calendar event. For example, a provider that is associated with a highly severe conflict can be ranked lower than a provider associated with a less severe conflict.

[0076] In some configurations, the analysis of location data 125, map data 127, weather data 136, and/or traffic data 124 can influence a selection and/or ranking of one or more providers. For instance, a first provider may be ranked higher than a second provider if the first provider involves a shorter commute versus the second provider. Such an analysis may also involve map data, weather data, and other data to determine projections of commute times, a probability of a commute, and/or a degree of difficulty of a commute.

[0077] In some configurations, the analysis of location data 125 and scheduling data 131 can influence a selection and/or ranking of one or more providers. For instance, if a particular provider has two calendar events that are adjacent to one another, a probability of a successful commute between the events can be determined. A provider having a high probability of a successful commute can be ranked higher than a provider having a low probability of a successful commute.

[0078] Such an analysis can apply to the commute of the customer. For instance, if a consumer has two appointments that are adjacent to one another, a probability associated with the consumer's commute between the appointments can influence the selection and/or ranking of one or more providers. For example, if the user scheduling data 131 indicates that the consumer only has 20 minutes to commute to the location of a particular provider, the map data 127, traffic data 124, and other contextual data can be analyzed to determine if that commute is possible within the given timeframe. A probability may be generated for a commute to each provider, and each provider may be ranked based on such generated data. In addition, one or more providers may be filtered from the list if the probability does not meet or exceed one or more thresholds.

[0079] In yet another example, traffic data 124 can indicate traffic conditions at the desired date and time indicated in the input data. In such configurations, one or more devices and/or the server 120 can generate projections to determine if a user or provider can make an appointment based on traffic patterns. For instance, if the appointment is scheduled for a weekday during rush hour, the techniques disclosed herein can change the ranking of a particular provider if a commute associated with that provider is impacted by such traffic conditions. Such an analysis can be influenced by a forecast defined in weather data 136. For example, if weather data 136 indicates a favorable forecast, the ranking of providers impacted by such a forecast can increase. In addition, if weather data 136 indicates an unfavorable forecast, the ranking of providers impacted by such a forecast can decrease.

[0080] In some configurations, the analysis of work history data 133, skill set data 135, workflow data 128, workload data 132 and/or other contextual data can influence a selection and/or ranking of one or more providers. For instance, a particular provider having a high quality rating may be ranked higher than a provider having a low quality rating. In another example, the skill set 135 can be analyzed to determine if an ability of a provider aligns with goals associated with a particular appointment. Data quantifying an

alignment between the skill set of a provider with one or more goals can influence the ranking of that provider and/or other providers.

[0081] In another example, a provider having a heavier workload can be ranked higher or lower than a provider having a lighter workload. In yet another example, workflow data 128 can be analyzed to determine the ranking of a particular provider. For instance, workflow data 128 defining a multistep process indicates that a particular provider is more suitable for a particular step, the ranking of such a provider maybe higher than a provider that is less suitable for that particular step. These examples are provided for illustrative purposes and are not to be construed as limiting.

[0082] In some configurations, work history data 133 can define the status of a relationship between two or more entities. For instance, if two or more entities are currently working on a project, a ranking with respect to a customer and/or a provider may be increased. If the two or more parties have not worked together for some time, a ranking with respect to a customer and or a provider may be increased or decreased depending on a desired outcome. For instance, if a customer having a high lifetime value, such as The Gates Foundation, desires to set an appointment with a provider, such providers seeking such customers may be ranked higher than other providers.

[0083] In some configurations, a ranking and/or selection of a provider can be based on payment history data. For example, if payments of a customer are regularly made on time, the ranking of a provider desiring such customers may be increased. In some configurations, preference data may define a threshold for a provider. If performance data associated with a customer falls below a threshold, e.g., with respect to payments, communication, and/or complaints, the techniques disclosed herein can cause the generation of data providing notice that a customer relationship should be terminated. Other data providing notice of reminders can be generated in response to one more conditions, such as a late payment, a history of late payments, complaints, etc. In such configurations, emails, meeting notifications or other forms of data objects can be generated when such conditions are discovered by the system.

[0084] Similar to the prior example, FIGURE 3B illustrates another example of a ranked list 330 of items, e.g., providers, based, at least in part, on the input data and contextual data. For illustrative purposes, the second provider 335 on the list 330, Larry's Shop, is selected by the user. Based on such a selection, metadata 140 associated with the selected provider 335 may be obtained from one or more resources. The metadata 140 may be used to populate one or more data entry fields in the UI. For instance, as shown in

FIGURE 3C, the metadata 140 may be used to populate the text entry field, such as the provider number UI element 305E.

[0085] The examples provided herein are for illustrative purposes and are not to be construed as limiting. Although the examples provided herein illustrate graphical user interfaces for customers that are scheduling appointment and/or completing a form, it can be appreciated that the techniques disclosed herein can also be utilized by providers or other types of users scheduling appointments or completing forms having data entry fields.

[0086] Turning now to FIGURE 4, aspects of a routine 400 for providing resource-based auto completion for data entry fields are shown and described below. It should be understood that the operations of the methods disclosed herein are not necessarily presented in any particular order and that performance of some or all of the operations in an alternative order(s) is possible and is contemplated. The operations have been presented in the demonstrated order for ease of description and illustration. Operations may be added, omitted, and/or performed simultaneously, without departing from the scope of the appended claims.

[0087] It also should be understood that the illustrated methods can be ended at any time and need not be performed in its entirety. Some or all operations of the methods, and/or substantially equivalent operations, can be performed by execution of computer-readable instructions included on a computer-storage media, as defined below. The term "computer-readable instructions," and variants thereof, as used in the description and claims, is used expansively herein to include routines, applications, application modules, program modules, programs, components, data structures, algorithms, and the like. Computer-readable instructions can be implemented on various system configurations, including single-processor or multiprocessor systems, minicomputers, mainframe computers, personal computers, hand-held computing devices, microprocessor-based, programmable consumer electronics, combinations thereof, and the like.

[0088] Thus, it should be appreciated that the logical operations described herein are implemented (1) as a sequence of computer implemented acts or program modules running on a computing system and/or (2) as interconnected machine logic circuits or circuit modules within the computing system. The implementation is a matter of choice dependent on the performance and other requirements of the computing system. Accordingly, the logical operations described herein are referred to variously as states, operations, structural devices, acts, or modules. These operations, structural devices, acts,

and modules may be implemented in software, in firmware, in special purpose digital logic, and any combination thereof.

[0089] As will be described in more detail below, in conjunction with FIGURE 1, the operations of the routine 400 are described herein as being implemented, at least in part, by an application, component, and/or circuit. Although the following illustration refers to the components of FIGURE 1, it can be appreciated that the operations of the routine 400 may be also implemented in many other ways. For example, the routine 400 may be implemented, at least in part, by computer processor or processor of another computer. In addition, one or more of the operations of the routine 400 may alternatively or additionally be implemented, at least in part, by a computer working alone or in conjunction with other software modules, such as the server module 121.

[0090] With reference to FIGURE 4, the routine 400 begins at operation 401, where one or more computing devices obtain input data. The input data can include a voice input, a text input, a selection of a menu item, or other types of input where an action is initiated by, or data is received from, a user or a computing device. For example, a user can select a menu item. In other examples, a user can provide other forms of input data, such as a text description or a voice input indicating an area of interest, service category, and/or a topic of interest. In one illustrative example, the input data can define an appointment for a service, e.g., auto repair, lawn care, legal services, etc. In such configurations, the input data can provide scheduling data indicating, among other items, a service type, a description of a desired service, a desired location, date and/or time.

[0091] At operation 403, the one or more computing devices obtain contextual data. As described herein, the contextual data can be obtained from a number of different resources. For example, contextual data can be obtained from a traffic data resource 106A, map data resource 106B, search engine resource 106C, specialty data resource 106D, and a weather data resource 106E, and/or other resources suitable for storing, processing, and/or communicating contextual data. The contextual data can be related to service providers and/or consumers. The contextual data can include, for example, data defining a prior work history between two or more entities, payment histories, credit histories, an availability of one or more parties, a location of a project, travel time to an appointment, traffic data, skill set data, preferred business hours, scheduling availability, performance metrics, scheduling conflicts, customer preferences, vendor preferences, workflow definitions, other data, and combinations thereof. The techniques disclosed herein can also quantify a value of a customer or a value of a vendor. Such contextual data can be received

from one or more resources or such contextual data can be derived from other types of contextual data. For instance, data defining a lifetime value of a customer can be generated from payment histories, credit histories, and other information.

[0092] At operation 405, one or more computing devices can generate a ranked list of items based on the input data and the obtained contextual data. The ranked list of items can be automatically generated, or the ranked list of items can be generated in response to one or more actions. In one example, criteria defined in user preference data can indicate one or more thresholds for generating a ranked list of items. The contextual data can be analyzed to determine the presence of a condition that meets or exceeds the one or more thresholds. When such conditions are discovered, such as the completion of the task, the presence of a particular price of a product or service, or other actions, one or more computing devices can generate the ranked list of items.

[0093] In another example, a ranked list of items can be generated in response to a user action. For example, when a user provides input data defining a calendar item, the input data and the contextual data can be processed by the use of the techniques described herein to generate a ranked list of items.

[0094] At operation 407, one or more computing devices can display the ranked list. The ranked list may be displayed in proximity to a graphical element for receiving input data. For example, as shown in FIGURE 3B, the ranked list 330 is displayed in proximity to the provider name UI element 305D. In some configurations, a graphical element displaying the ranked list may be configured to receive a user selection of one item of the list.

[0095] At operation 409, one or more computing devices can receive a selection of at least one item of the list. A selection of at least one item can be achieved by a number of different methods. For instance, operation 409 can involve a user input indicating a selection of an item. In other examples, operation 409 can involve techniques for an automatic selection of one or more items. In such configurations, preference data can define criteria for an automatic selection of one or more items. For instance, if an item is associated with performance data that meets the threshold defined in preference data of a provider or a consumer, such items can be automatically selected by the one or more computing devices.

[0096] Next, at operation 411, one or more computing devices can populate data fields of a UI with metadata related to the selected items. Operation 411 may involve the retrieval of metadata 140. The retrieval of the metadata 141 can be in response to a

selection of an item. The metadata 140 can be related to providers or customers. The metadata 140 can include a company name, contact information, location data, and other related data. Such metadata 140 can be populated into one or more data entry fields of a UI.

[0097] FIGURE 5 shows additional details of an example computer architecture 500 for a computer, such as the computing device 101 (FIGURE 1), capable of executing the program components described herein. Thus, the computer architecture 500 illustrated in FIGURE 5 illustrates an architecture for a server computer, mobile phone, a PDA, a smart phone, a desktop computer, a netbook computer, a tablet computer, and/or a laptop computer. The computer architecture 500 may be utilized to execute any aspects of the software components presented herein.

[0098] The computer architecture 500 illustrated in FIGURE 5 includes a central processing unit 502 ("CPU"), a system memory 504, including a random access memory 506 ("RAM") and a read-only memory ("ROM") 508, and a system bus 510 that couples the memory 504 to the CPU 502. A basic input/output system containing the basic routines that help to transfer information between elements within the computer architecture 500, such as during startup, is stored in the ROM 508. The computer architecture 500 further includes a mass storage device 512 for storing an operating system 507, data, such as the contextual data 550, input data 551, and one or more application programs.

[0099] The mass storage device 512 is connected to the CPU 502 through a mass storage controller (not shown) connected to the bus 510. The mass storage device 512 and its associated computer-readable media provide non-volatile storage for the computer architecture 500. Although the description of computer-readable media contained herein refers to a mass storage device, such as a solid state drive, a hard disk or CD-ROM drive, it should be appreciated by those skilled in the art that computer-readable media can be any available computer storage media or communication media that can be accessed by the computer architecture 500.

[0100] Communication media includes computer readable instructions, data structures, program modules, or other data in a modulated data signal such as a carrier wave or other transport mechanism and includes any delivery media. The term "modulated data signal" means a signal that has one or more of its characteristics changed or set in a manner as to encode information in the signal. By way of example, and not limitation, communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, RF, infrared and other wireless media.

Combinations of the any of the above should also be included within the scope of computer-readable media.

[0101] By way of example, and not limitation, computer storage media may include volatile and non-volatile, removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. For example, computer media includes, but is not limited to, RAM, ROM, EPROM, EEPROM, flash memory or other solid state memory technology, CD-ROM, digital versatile disks ("DVD"), HD-DVD, BLU-RAY, or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computer architecture 500. For purposes the claims, the phrase "computer storage medium," "computer-readable storage medium" and variations thereof, does not include waves, signals, and/or other transitory and/or intangible communication media, per se.

[0102] According to various configurations, the computer architecture 500 may operate in a networked environment using logical connections to remote computers through the network 756 and/or another network (not shown). The computer architecture 500 may connect to the network 756 through a network interface unit 514 connected to the bus 510. It should be appreciated that the network interface unit 514 also may be utilized to connect to other types of networks and remote computer systems. The computer architecture 500 also may include an input/output controller 516 for receiving and processing input from a number of other devices, including a keyboard, mouse, or electronic stylus (not shown in FIGURE 5). Similarly, the input/output controller 516 may provide output to a display screen, a printer, or other type of output device (also not shown in FIGURE 5).

[0103] It should be appreciated that the software components described herein may, when loaded into the CPU 502 and executed, transform the CPU 502 and the overall computer architecture 500 from a general-purpose computing system into a special-purpose computing system customized to facilitate the functionality presented herein. The CPU 502 may be constructed from any number of transistors or other discrete circuit elements, which may individually or collectively assume any number of states. More specifically, the CPU 502 may operate as a finite-state machine, in response to executable instructions contained within the software modules disclosed herein. These computer-executable instructions may transform the CPU 502 by specifying how the CPU 502

transitions between states, thereby transforming the transistors or other discrete hardware elements constituting the CPU 502.

[0104] Encoding the software modules presented herein also may transform the physical structure of the computer-readable media presented herein. The specific transformation of physical structure may depend on various factors, in different implementations of this description. Examples of such factors may include, but are not limited to, the technology used to implement the computer-readable media, whether the computer-readable media is characterized as primary or secondary storage, and the like. For example, if the computer-readable media is implemented as semiconductor-based memory, the software disclosed herein may be encoded on the computer-readable media by transforming the physical state of the semiconductor memory. For example, the software may transform the state of transistors, capacitors, or other discrete circuit elements constituting the semiconductor memory. The software also may transform the physical state of such components in order to store data thereupon.

[0105] As another example, the computer-readable media disclosed herein may be implemented using magnetic or optical technology. In such implementations, the software presented herein may transform the physical state of magnetic or optical media, when the software is encoded therein. These transformations may include altering the magnetic characteristics of particular locations within given magnetic media. These transformations also may include altering the physical features or characteristics of particular locations within given optical media, to change the optical characteristics of those locations. Other transformations of physical media are possible without departing from the scope and spirit of the present description, with the foregoing examples provided only to facilitate this discussion.

[0106] In light of the above, it should be appreciated that many types of physical transformations take place in the computer architecture 500 in order to store and execute the software components presented herein. It also should be appreciated that the computer architecture 500 may include other types of computing devices, including hand-held computers, embedded computer systems, personal digital assistants, and other types of computing devices known to those skilled in the art. It is also contemplated that the computer architecture 500 may not include all of the components shown in FIGURE 5, may include other components that are not explicitly shown in FIGURE 5, or may utilize an architecture completely different than that shown in FIGURE 5.

[0107] FIGURE 6 depicts an illustrative distributed computing environment 600 capable of executing the software components described herein for providing resource-based auto completion for data entry fields. Thus, the distributed computing environment 600 illustrated in FIGURE 6 can be utilized to execute any aspects of the software components presented herein. For example, the distributed computing environment 600 can be utilized to execute aspects of the software components described herein.

[0108] According to various implementations, the distributed computing environment 600 includes a computing environment 602 operating on, in communication with, or as part of the network 604. The network 604 may be or may include the network 756, described above with reference to FIGURE 5. The network 604 also can include various access networks. One or more client devices 606A-606N (hereinafter referred to collectively and/or generically as "clients 606") can communicate with the computing environment 602 via the network 604 and/or other connections (not illustrated in FIGURE 6). In one illustrated configuration, the clients 606 include a computing device 606A such as a laptop computer, a desktop computer, or other computing device; a slate or tablet computing device ("tablet computing device") 606B; a mobile computing device 606C such as a mobile telephone, a smart phone, or other mobile computing device; a server computer 606D; and/or other devices 606N. It should be understood that any number of clients 606 can communicate with the computing environment 602. Two example computing architectures for the clients 606 are illustrated and described herein with reference to FIGURES 5 and 7. It should be understood that the illustrated clients 606 and computing architectures illustrated and described herein are illustrative, and should not be construed as being limited in any way.

[0109] In the illustrated configuration, the computing environment 602 includes application servers 608, data storage 610, and one or more network interfaces 612. According to various implementations, the functionality of the application servers 608 can be provided by one or more server computers that are executing as part of, or in communication with, the network 604. The application servers 608 can host various services, virtual machines, portals, and/or other resources. In the illustrated configuration, the application servers 608 host one or more virtual machines 614 for hosting applications or other functionality. According to various implementations, the virtual machines 614 host one or more applications and/or software modules for providing resource-based auto completion for data entry fields. It should be understood that this configuration is illustrative, and should not be construed as being limiting in any way. The application

servers 608 also host or provide access to one or more portals, link pages, Web sites, and/or other information ("Web portals") 616.

[0110] According to various implementations, the application servers 608 also include one or more mailbox services 618 and one or more messaging services 620. The mailbox services 618 can include electronic mail ("email") services. The mailbox services 618 also can include various personal information management ("PIM") services including, but not limited to, calendar services, contact management services, collaboration services, and/or other services. The messaging services 620 can include, but are not limited to, instant messaging services, chat services, forum services, and/or other communication services.

[0111] The application servers 608 also may include one or more social networking services 622. The social networking services 622 can include various social networking services including, but not limited to, services for sharing or posting status updates, instant messages, links, photos, videos, and/or other information; services for commenting or displaying interest in articles, products, blogs, or other resources; and/or other services. In some configurations, the social networking services 622 are provided by or include the FACEBOOK social networking service, the LINKEDIN professional networking service, the MYSPACE social networking service, the FOURSQUARE geographic networking service, the YAMMER office colleague networking service, and the like. In other configurations, the social networking services 622 are provided by other services, sites, and/or providers that may or may not be explicitly known as social networking providers. For example, some web sites allow users to interact with one another via email, chat services, and/or other means during various activities and/or contexts such as reading published articles, commenting on goods or services, publishing, collaboration, gaming, and the like. Examples of such services include, but are not limited to, the WINDOWS LIVE service and the XBOX LIVE service from Microsoft Corporation in Redmond, Washington. Other services are possible and are contemplated.

[0112] The social networking services 622 also can include commenting, blogging, and/or micro blogging services. Examples of such services include, but are not limited to, the YELP commenting service, the KUDZU review service, the OFFICETALK enterprise micro blogging service, the TWITTER messaging service, the GOOGLE BUZZ service, and/or other services. It should be appreciated that the above lists of services are not exhaustive and that numerous additional and/or alternative social networking services 622 are not mentioned herein for the sake of brevity. As such, the above configurations are

illustrative, and should not be construed as being limited in any way. According to various implementations, the social networking services 622 may host one or more applications and/or software modules for providing the functionality described herein, such as providing resource-based auto completion for data entry fields. For instance, any one of the application servers 608 may communicate or facilitate the functionality and features described herein. For instance, a social networking application, mail client, messaging client or a browser running on a phone or any other client 606 may communicate with a networking service 622 and facilitate the functionality, even in part, described above with respect to FIGURE 4.

[0113] As shown in FIGURE 6, the application servers 608 also can host other services, applications, portals, and/or other resources ("other resources") 624. The other resources 624 can include, but are not limited to, document sharing, rendering or any other functionality. It thus can be appreciated that the computing environment 602 can provide integration of the concepts and technologies disclosed herein provided herein with various mailbox, messaging, social networking, and/or other services or resources.

[0114] As mentioned above, the computing environment 602 can include the data storage 610. According to various implementations, the functionality of the data storage 610 is provided by one or more databases operating on, or in communication with, the network 604. The functionality of the data storage 610 also can be provided by one or more server computers configured to host data for the computing environment 602. The data storage 610 can include, host, or provide one or more real or virtual datastores 626A-626N (hereinafter referred to collectively and/or generically as "datastores 626"). The datastores 626 are configured to host data used or created by the application servers 608 and/or other data. Although not illustrated in FIGURE 6, the datastores 626 also can host or store web page documents, word documents, presentation documents, data structures, algorithms for execution by a recommendation engine, and/or other data utilized by any application program or another module. Aspects of the datastores 626 may be associated with a service for storing files.

[0115] The computing environment 602 can communicate with, or be accessed by, the network interfaces 612. The network interfaces 612 can include various types of network hardware and software for supporting communications between two or more computing devices including, but not limited to, the clients 606 and the application servers 608. It should be appreciated that the network interfaces 612 also may be utilized to connect to other types of networks and/or computer systems.

[0116] It should be understood that the distributed computing environment 600 described herein can provide any aspects of the software elements described herein with any number of virtual computing resources and/or other distributed computing functionality that can be configured to execute any aspects of the software components disclosed herein. According to various implementations of the concepts and technologies disclosed herein, the distributed computing environment 600 provides the software functionality described herein as a service to the clients 606. It should be understood that the clients 606 can include real or virtual machines including, but not limited to, server computers, web servers, personal computers, mobile computing devices, smart phones, and/or other devices. As such, various configurations of the concepts and technologies disclosed herein enable any device configured to access the distributed computing environment 600 to utilize the functionality described herein for providing resource-based auto completion for data entry fields, among other aspects. In one specific example, as summarized above, techniques described herein may be implemented, at least in part, by the web browser application 510 of FIGURE 5, which works in conjunction with the application servers 608 of FIGURE 6.

[0117] Turning now to FIGURE 7, an illustrative computing device architecture 700 for a computing device that is capable of executing various software components described herein for providing resource-based auto completion for data entry fields. The computing device architecture 700 is applicable to computing devices that facilitate mobile computing due, in part, to form factor, wireless connectivity, and/or battery-powered operation. In some configurations, the computing devices include, but are not limited to, mobile telephones, tablet devices, slate devices, portable video game devices, and the like. The computing device architecture 700 is applicable to any of the clients 606 shown in FIGURE 6. Moreover, aspects of the computing device architecture 700 may be applicable to traditional desktop computers, portable computers (e.g., laptops, notebooks, ultra-portables, and netbooks), server computers, and other computer systems, such as described herein with reference to FIGURE 5. For example, the single touch and multi-touch aspects disclosed herein below may be applied to desktop computers that utilize a touchscreen or some other touch-enabled device, such as a touch-enabled track pad or touch-enabled mouse.

[0118] The computing device architecture 700 illustrated in FIGURE 7 includes a processor 702, memory components 704, network connectivity components 706, sensor components 708, input/output components 710, and power components 712. In the

illustrated configuration, the processor 702 is in communication with the memory components 704, the network connectivity components 706, the sensor components 708, the input/output ("I/O") components 710, and the power components 712. Although no connections are shown between the individuals components illustrated in FIGURE 7, the components can interact to carry out device functions. In some configurations, the components are arranged so as to communicate via one or more busses (not shown).

[0119] The processor 702 includes a central processing unit ("CPU") configured to process data, execute computer-executable instructions of one or more application programs, and communicate with other components of the computing device architecture 700 in order to perform various functionality described herein. The processor 702 may be utilized to execute aspects of the software components presented herein and, particularly, those that utilize, at least in part, a touch-enabled input.

[0120] In some configurations, the processor 702 includes a graphics processing unit ("GPU") configured to accelerate operations performed by the CPU, including, but not limited to, operations performed by executing general-purpose scientific and/or engineering computing applications, as well as graphics-intensive computing applications such as high resolution video (e.g., 720P, 1080P, and higher resolution), video games, three-dimensional ("3D") modeling applications, and the like. In some configurations, the processor 702 is configured to communicate with a discrete GPU (not shown). In any case, the CPU and GPU may be configured in accordance with a co-processing CPU/GPU computing model, wherein the sequential part of an application executes on the CPU and the computationally-intensive part is accelerated by the GPU.

[0121] In some configurations, the processor 702 is, or is included in, a system-on-chip ("SoC") along with one or more of the other components described herein below. For example, the SoC may include the processor 702, a GPU, one or more of the network connectivity components 706, and one or more of the sensor components 708. In some configurations, the processor 702 is fabricated, in part, utilizing a package-on-package ("PoP") integrated circuit packaging technique. The processor 702 may be a single core or multi-core processor.

[0122] The processor 702 may be created in accordance with an ARM architecture, available for license from ARM HOLDINGS of Cambridge, United Kingdom. Alternatively, the processor 702 may be created in accordance with an x86 architecture, such as is available from INTEL CORPORATION of Mountain View, California and others. In some configurations, the processor 702 is a SNAPDRAGON SoC, available

from QUALCOMM of San Diego, California, a TEGRA SoC, available from NVIDIA of Santa Clara, California, a HUMMINGBIRD SoC, available from SAMSUNG of Seoul, South Korea, an Open Multimedia Application Platform ("OMAP") SoC, available from TEXAS INSTRUMENTS of Dallas, Texas, a customized version of any of the above SoCs, or a proprietary SoC.

[0123] The memory components 704 include a random access memory ("RAM") 714, a read-only memory ("ROM") 716, an integrated storage memory ("integrated storage") 718, and a removable storage memory ("removable storage") 720. In some configurations, the RAM 714 or a portion thereof, the ROM 716 or a portion thereof, and/or some combination the RAM 714 and the ROM 716 is integrated in the processor 702. In some configurations, the ROM 716 is configured to store a firmware, an operating system or a portion thereof (e.g., operating system kernel), and/or a bootloader to load an operating system kernel from the integrated storage 718 and/or the removable storage 720.

[0124] The integrated storage 718 can include a solid-state memory, a hard disk, or a combination of solid-state memory and a hard disk. The integrated storage 718 may be soldered or otherwise connected to a logic board upon which the processor 702 and other components described herein also may be connected. As such, the integrated storage 718 is integrated in the computing device. The integrated storage 718 is configured to store an operating system or portions thereof, application programs, data, and other software components described herein.

[0125] The removable storage 720 can include a solid-state memory, a hard disk, or a combination of solid-state memory and a hard disk. In some configurations, the removable storage 720 is provided in lieu of the integrated storage 718. In other configurations, the removable storage 720 is provided as additional optional storage. In some configurations, the removable storage 720 is logically combined with the integrated storage 718 such that the total available storage is made available as a total combined storage capacity. In some configurations, the total combined capacity of the integrated storage 718 and the removable storage 720 is shown to a user instead of separate storage capacities for the integrated storage 718 and the removable storage 720.

[0126] The removable storage 720 is configured to be inserted into a removable storage memory slot (not shown) or other mechanism by which the removable storage 720 is inserted and secured to facilitate a connection over which the removable storage 720 can communicate with other components of the computing device, such as the processor 702. The removable storage 720 may be embodied in various memory card formats including,

but not limited to, PC card, CompactFlash card, memory stick, secure digital ("SD"), miniSD, microSD, universal integrated circuit card ("UICC") (e.g., a subscriber identity module ("SIM") or universal SIM ("USIM")), a proprietary format, or the like.

[0127] It can be understood that one or more of the memory components 704 can store an operating system. According to various configurations, the operating system includes, but is not limited to WINDOWS MOBILE OS from Microsoft Corporation of Redmond, Washington, WINDOWS PHONE OS from Microsoft Corporation, WINDOWS from Microsoft Corporation, PALM WEBOS from Hewlett-Packard Company of Palo Alto, California, BLACKBERRY OS from Research In Motion Limited of Waterloo, Ontario, Canada, IOS from Apple Inc. of Cupertino, California, and ANDROID OS from Google Inc. of Mountain View, California. Other operating systems are contemplated.

[0128] The network connectivity components 706 include a wireless wide area network component ("WWAN component") 722, a wireless local area network component ("WLAN component") 724, and a wireless personal area network component ("WPAN component") 726. The network connectivity components 706 facilitate communications to and from the network 756 or another network, which may be a WWAN, a WLAN, or a WPAN. Although only the network 756 is illustrated, the network connectivity components 706 may facilitate simultaneous communication with multiple networks, including the network 604 of FIGURE 6. For example, the network connectivity components 706 may facilitate simultaneous communications with multiple networks via one or more of a WWAN, a WLAN, or a WPAN.

[0129] The network 756 may be or may include a WWAN, such as a mobile telecommunications network utilizing one or more mobile telecommunications technologies to provide voice and/or data services to a computing device utilizing the computing device architecture 700 via the WWAN component 722. The mobile telecommunications technologies can include, but are not limited to, Global System for Mobile communications ("GSM"), Code Division Multiple Access ("CDMA") ONE, CDMA7000, Universal Mobile Telecommunications System ("UMTS"), Long Term Evolution ("LTE"), and Worldwide Interoperability for Microwave Access ("WiMAX"). Moreover, the network 756 may utilize various channel access methods (which may or may not be used by the aforementioned standards) including, but not limited to, Time Division Multiple Access ("TDMA"), Frequency Division Multiple Access ("FDMA"), CDMA, wideband CDMA ("W-CDMA"), Orthogonal Frequency Division Multiplexing

("OFDM"), Space Division Multiple Access ("SDMA"), and the like. Data communications may be provided using General Packet Radio Service ("GPRS"), Enhanced Data rates for Global Evolution ("EDGE"), the High-Speed Packet Access ("HSPA") protocol family including High-Speed Downlink Packet Access ("HSDPA"), Enhanced Uplink ("EUL") or otherwise termed High-Speed Uplink Packet Access ("HSUPA"), Evolved HSPA ("HSPA+"), LTE, and various other current and future wireless data access standards. The network 756 may be configured to provide voice and/or data communications with any combination of the above technologies. The network 756 may be configured to or adapted to provide voice and/or data communications in accordance with future generation technologies.

[0130] In some configurations, the WWAN component 722 is configured to provide dual- multi-mode connectivity to the network 756. For example, the WWAN component 722 may be configured to provide connectivity to the network 756, wherein the network 756 provides service via GSM and UMTS technologies, or via some other combination of technologies. Alternatively, multiple WWAN components 722 may be utilized to perform such functionality, and/or provide additional functionality to support other non-compatible technologies (i.e., incapable of being supported by a single WWAN component). The WWAN component 722 may facilitate similar connectivity to multiple networks (e.g., a UMTS network and an LTE network).

[0131] The network 756 may be a WLAN operating in accordance with one or more Institute of Electrical and Electronic Engineers ("IEEE") 802.11 standards, such as IEEE 802.11a, 802.11b, 802.11g, 802.11n, and/or future 802.11 standard (referred to herein collectively as WI-FI). Draft 802.11 standards are also contemplated. In some configurations, the WLAN is implemented utilizing one or more wireless WI-FI access points. In some configurations, one or more of the wireless WI-FI access points are another computing device with connectivity to a WWAN that are functioning as a WI-FI hotspot. The WLAN component 724 is configured to connect to the network 756 via the WI-FI access points. Such connections may be secured via various encryption technologies including, but not limited, WI-FI Protected Access ("WPA"), WPA2, Wired Equivalent Privacy ("WEP"), and the like.

[0132] The network 756 may be a WPAN operating in accordance with Infrared Data Association ("IrDA"), BLUETOOTH, wireless Universal Serial Bus ("USB"), Z-Wave, ZIGBEE, or some other short-range wireless technology. In some configurations,

the WPAN component 726 is configured to facilitate communications with other devices, such as peripherals, computers, or other computing devices via the WPAN.

[0133] The sensor components 708 include a magnetometer 728, an ambient light sensor 730, a proximity sensor 732, an accelerometer 734, a gyroscope 736, and a Global Positioning System sensor ("GPS sensor") 738. It is contemplated that other sensors, such as, but not limited to, temperature sensors or shock detection sensors, also may be incorporated in the computing device architecture 700.

[0134] The magnetometer 728 is configured to measure the strength and direction of a magnetic field. In some configurations the magnetometer 728 provides measurements to a compass application program stored within one of the memory components 704 in order to provide a user with accurate directions in a frame of reference including the cardinal directions, north, south, east, and west. Similar measurements may be provided to a navigation application program that includes a compass component. Other uses of measurements obtained by the magnetometer 728 are contemplated.

[0135] The ambient light sensor 730 is configured to measure ambient light. In some configurations, the ambient light sensor 730 provides measurements to an application program stored within one the memory components 704 in order to automatically adjust the brightness of a display (described below) to compensate for low-light and high-light environments. Other uses of measurements obtained by the ambient light sensor 730 are contemplated.

[0136] The proximity sensor 732 is configured to detect the presence of an object or thing in proximity to the computing device without direct contact. In some configurations, the proximity sensor 732 detects the presence of a user's body (e.g., the user's face) and provides this information to an application program stored within one of the memory components 704 that utilizes the proximity information to enable or disable some functionality of the computing device. For example, a telephone application program may automatically disable a touchscreen (described below) in response to receiving the proximity information so that the user's face does not inadvertently end a call or enable/disable other functionality within the telephone application program during the call. Other uses of proximity as detected by the proximity sensor 732 are contemplated.

[0137] The accelerometer 734 is configured to measure proper acceleration. In some configurations, output from the accelerometer 734 is used by an application program as an input mechanism to control some functionality of the application program. For example, the application program may be a video game in which a character, a portion

thereof, or an object is moved or otherwise manipulated in response to input received via the accelerometer 734. In some configurations, output from the accelerometer 734 is provided to an application program for use in switching between landscape and portrait modes, calculating coordinate acceleration, or detecting a fall. Other uses of the accelerometer 734 are contemplated.

[0138] The gyroscope 736 is configured to measure and maintain orientation. In some configurations, output from the gyroscope 736 is used by an application program as an input mechanism to control some functionality of the application program. For example, the gyroscope 736 can be used for accurate recognition of movement within a 3D environment of a video game application or some other application. In some configurations, an application program utilizes output from the gyroscope 736 and the accelerometer 734 to enhance control of some functionality of the application program. Other uses of the gyroscope 736 are contemplated.

[0139] The GPS sensor 738 is configured to receive signals from GPS satellites for use in calculating a location. The location calculated by the GPS sensor 738 may be used by any application program that requires or benefits from location information. For example, the location calculated by the GPS sensor 738 may be used with a navigation application program to provide directions from the location to a destination or directions from the destination to the location. Moreover, the GPS sensor 738 may be used to provide location information to an external location-based service, such as E911 service. The GPS sensor 738 may obtain location information generated via WI-FI, WIMAX, and/or cellular triangulation techniques utilizing one or more of the network connectivity components 706 to aid the GPS sensor 738 in obtaining a location fix. The GPS sensor 738 may also be used in Assisted GPS ("A-GPS") systems.

[0140] The I/O components 710 include a display 740, a touchscreen 742, a data I/O interface component ("data I/O") 744, an audio I/O interface component ("audio I/O") 746, a video I/O interface component ("video I/O") 748, and a camera 750. In some configurations, the display 740 and the touchscreen 742 are combined. In some configurations two or more of the data I/O component 744, the audio I/O component 746, and the video I/O component 748 are combined. The I/O components 710 may include discrete processors configured to support the various interface described below, or may include processing functionality built-in to the processor 702.

[0141] The display 740 is an output device configured to present information in a visual form. In particular, the display 740 may present graphical user interface ("GUI")

elements, text, images, video, notifications, virtual buttons, virtual keyboards, messaging data, Internet content, device status, time, date, calendar data, preferences, map information, location information, and any other information that is capable of being presented in a visual form. In some configurations, the display 740 is a liquid crystal display ("LCD") utilizing any active or passive matrix technology and any backlighting technology (if used). In some configurations, the display 740 is an organic light emitting diode ("OLED") display. Other display types are contemplated.

[0142] The touchscreen 742, also referred to herein as a "touch-enabled screen," is an input device configured to detect the presence and location of a touch. The touchscreen 742 may be a resistive touchscreen, a capacitive touchscreen, a surface acoustic wave touchscreen, an infrared touchscreen, an optical imaging touchscreen, a dispersive signal touchscreen, an acoustic pulse recognition touchscreen, or may utilize any other touchscreen technology. In some configurations, the touchscreen 742 is incorporated on top of the display 740 as a transparent layer to enable a user to use one or more touches to interact with objects or other information presented on the display 740. In other configurations, the touchscreen 742 is a touch pad incorporated on a surface of the computing device that does not include the display 740. For example, the computing device may have a touchscreen incorporated on top of the display 740 and a touch pad on a surface opposite the display 740.

[0143] In some configurations, the touchscreen 742 is a single-touch touchscreen. In other configurations, the touchscreen 742 is a multi-touch touchscreen. In some configurations, the touchscreen 742 is configured to detect discrete touches, single touch gestures, and/or multi-touch gestures. These are collectively referred to herein as gestures for convenience. Several gestures will now be described. It should be understood that these gestures are illustrative and are not intended to limit the scope of the appended claims. Moreover, the described gestures, additional gestures, and/or alternative gestures may be implemented in software for use with the touchscreen 742. As such, a developer may create gestures that are specific to a particular application program.

[0144] In some configurations, the touchscreen 742 supports a tap gesture in which a user taps the touchscreen 742 once on an item presented on the display 740. The tap gesture may be used for various reasons including, but not limited to, opening or launching whatever the user taps. In some configurations, the touchscreen 742 supports a double tap gesture in which a user taps the touchscreen 742 twice on an item presented on the display 740. The double tap gesture may be used for various reasons including, but not

limited to, zooming in or zooming out in stages. In some configurations, the touchscreen 742 supports a tap and hold gesture in which a user taps the touchscreen 742 and maintains contact for at least a pre-defined time. The tap and hold gesture may be used for various reasons including, but not limited to, opening a context-specific menu.

[0145] In some configurations, the touchscreen 742 supports a pan gesture in which a user places a finger on the touchscreen 742 and maintains contact with the touchscreen 742 while moving the finger on the touchscreen 742. The pan gesture may be used for various reasons including, but not limited to, moving through screens, images, or menus at a controlled rate. Multiple finger pan gestures are also contemplated. In some configurations, the touchscreen 742 supports a flick gesture in which a user swipes a finger in the direction the user wants the screen to move. The flick gesture may be used for various reasons including, but not limited to, scrolling horizontally or vertically through menus or pages. In some configurations, the touchscreen 742 supports a pinch and stretch gesture in which a user makes a pinching motion with two fingers (e.g., thumb and forefinger) on the touchscreen 742 or moves the two fingers apart. The pinch and stretch gesture may be used for various reasons including, but not limited to, zooming gradually in or out of a web site, map, or picture.

[0146] Although the above gestures have been described with reference to the use one or more fingers for performing the gestures, other appendages such as toes or objects such as styluses may be used to interact with the touchscreen 742. As such, the above gestures should be understood as being illustrative and should not be construed as being limiting in any way.

[0147] The data I/O interface component 744 is configured to facilitate input of data to the computing device and output of data from the computing device. In some configurations, the data I/O interface component 744 includes a connector configured to provide wired connectivity between the computing device and a computer system, for example, for synchronization operation purposes. The connector may be a proprietary connector or a standardized connector such as USB, micro-USB, mini-USB, or the like. In some configurations, the connector is a dock connector for docking the computing device with another device such as a docking station, audio device (e.g., a digital music player), or video device.

[0148] The audio I/O interface component 746 is configured to provide audio input and/or output capabilities to the computing device. In some configurations, the audio I/O interface component 746 includes a microphone configured to collect audio signals. In

some configurations, the audio I/O interface component 746 includes a headphone jack configured to provide connectivity for headphones or other external speakers. In some configurations, the audio I/O interface component 746 includes a speaker for the output of audio signals. In some configurations, the audio I/O interface component 746 includes an optical audio cable out.

[0149] The video I/O interface component 748 is configured to provide video input and/or output capabilities to the computing device. In some configurations, the video I/O interface component 748 includes a video connector configured to receive video as input from another device (e.g., a video media player such as a DVD or BLURAY player) or send video as output to another device (e.g., a monitor, a television, or some other external display). In some configurations, the video I/O interface component 748 includes a High-Definition Multimedia Interface ("HDMI"), mini-HDMI, micro-HDMI, DisplayPort, or proprietary connector to input/output video content. In some configurations, the video I/O interface component 748 or portions thereof is combined with the audio I/O interface component 746 or portions thereof.

[0150] The camera 750 can be configured to capture still images and/or video. The camera 750 may utilize a charge coupled device ("CCD") or a complementary metal oxide semiconductor ("CMOS") image sensor to capture images. In some configurations, the camera 750 includes a flash to aid in taking pictures in low-light environments. Settings for the camera 750 may be implemented as hardware or software buttons.

[0151] Although not illustrated, one or more hardware buttons may also be included in the computing device architecture 700. The hardware buttons may be used for controlling some operational aspect of the computing device. The hardware buttons may be dedicated buttons or multi-use buttons. The hardware buttons may be mechanical or sensor-based.

[0152] The illustrated power components 712 include one or more batteries 752, which can be connected to a battery gauge 754. The batteries 752 may be rechargeable or disposable. Rechargeable battery types include, but are not limited to, lithium polymer, lithium ion, nickel cadmium, and nickel metal hydride. Each of the batteries 752 may be made of one or more cells.

[0153] The battery gauge 754 can be configured to measure battery parameters such as current, voltage, and temperature. In some configurations, the battery gauge 754 is configured to measure the effect of a battery's discharge rate, temperature, age and other factors to predict remaining life within a certain percentage of error. In some

configurations, the battery gauge 754 provides measurements to an application program that is configured to utilize the measurements to present useful power management data to a user. Power management data may include one or more of a percentage of battery used, a percentage of battery remaining, a battery condition, a remaining time, a remaining capacity (e.g., in watt hours), a current draw, and a voltage.

[0154] The power components 712 may also include a power connector, which may be combined with one or more of the aforementioned I/O components 710. The power components 712 may interface with an external power system or charging equipment via an I/O component.

[0155] In closing, although the various configurations have been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended representations is not necessarily limited to the specific features or acts described. Rather, the specific features and acts are disclosed as example forms of implementing the claimed subject matter.

CLAIMS

1. A computer-implemented method comprising:

receiving input data at one or more graphical elements of a graphical user interface;

obtaining contextual data defining at least one of workload data and work history data associated with a plurality of providers;

generating data defining a level of eligibility for individual providers of the plurality of providers, wherein the level of eligibility is based, at least in part, on the contextual data defining at least one of workload data and work history data;

generating a ranked list of the plurality of providers in response to receiving the input data, wherein the individual providers of the plurality of providers are ranked based, at least in part, on the level of eligibility associated with individual providers;

causing a display of the ranked list on the graphical user interface;

receiving a selection of at least one individual provider of the individual providers; and

populating a data entry field with metadata associated with the individual provider in response to receiving the selection of the at least one individual provider.

2. The method of Claim 1, wherein the work history data defines one or more performance indicators pertaining to the plurality of providers, and wherein the individual provider is ranked based, at least in part, on the one or more performance indicators pertaining to the individual provider.

3. The method of Claim 1, wherein the workload data defines a value indicating an ability of the individual provider relative to a predetermined workload capacity, and wherein the individual provider is ranked based, at least in part, on the value indicating the ability of the individual provider relative to the predetermined workload capacity.

4. The method of Claim 1, wherein the contextual data defines a location pertaining to the individual provider, and wherein the individual provider is ranked based, at least in part, on the location pertaining to the individual provider.

5. The method of Claim 4, wherein the method further comprises generating data indicating a probability of a successful commute associated with the individual provider, the probability based, at least in part, on the location pertaining to the individual provider, and wherein the individual provider is ranked based, at least in part, on the probability.

6. The method of Claim 5, wherein the method further comprises obtaining map data, traffic data or weather data, and wherein the probability is based, at least in part, on the map data, traffic data or the weather data.

7. The method of Claim 1, wherein the method further comprises:

obtaining scheduling data associated with the individual provider; and

analyzing the scheduling data to generate data defining a severity of a scheduling conflict, and wherein the individual provider is ranked based, at least in part, on the data defining the severity of the scheduling conflict.

8. The method of Claim 1, wherein the method further comprises:

obtaining preference data; and

analyzing the preference data to a degree of alignment between the preference data and at least one of the workload data or the work history data, and wherein the individual provider is ranked based, at least in part, on the degree of alignment.

9. The method of Claim 1, wherein the metadata comprises contact information associated with the individual provider.

10. A system, comprising:

a processor; and

a memory in communication with the processor, the memory having computer-readable instructions stored thereupon that, when executed by the processor, cause the processor to perform a method comprising

receiving input data indicating a subject matter;

obtaining contextual data related to the subject matter, wherein the contextual data defines at least one of scheduling data, workload data, or work history data associated with a plurality of providers;

generating data defining a level of eligibility for individual providers of the plurality of providers, wherein the level of eligibility is based, at least in part, on the contextual data;

generating a ranked list of the plurality of providers in response to receiving the input data, wherein the individual providers of the plurality of providers are ranked based, at least in part, on the level of eligibility associated with individual providers;

causing a display of the ranked list on the graphical user interface;

receiving a selection of the individual provider; and

populating a data entry field with metadata associated with the individual provider in response to the selection of the individual provider.

11. The system of Claim 10, wherein the work history data defines one or more performance indicators pertaining to the plurality of providers, and wherein the individual provider is ranked based, at least in part, on the one or more performance indicators pertaining to the individual provider.

12. The system of Claim 10, wherein the workload data defines a value indicating an ability of the individual provider relative to a predetermined workload capacity, and wherein the individual provider is ranked based, at least in part, on the value indicating the ability of the individual provider relative to the predetermined workload capacity.

13. The system of Claim 10, wherein the contextual data defines a location pertaining to the individual provider, and wherein the individual provider is ranked based, at least in part, on the location pertaining to the individual provider.

14. The system of Claim 13, wherein the instructions cause the processor to perform the method comprising generating data indicating a probability of a successful commute associated with the individual provider, the probability based, at least in part, on the location pertaining to the individual provider, and wherein the individual provider is ranked based, at least in part, on the probability.

15. The system of Claim 14, wherein the instructions cause the processor to perform the method comprising obtaining map data, traffic data or weather data, and wherein the probability is based, at least in part, on the map data, traffic data or the weather data.

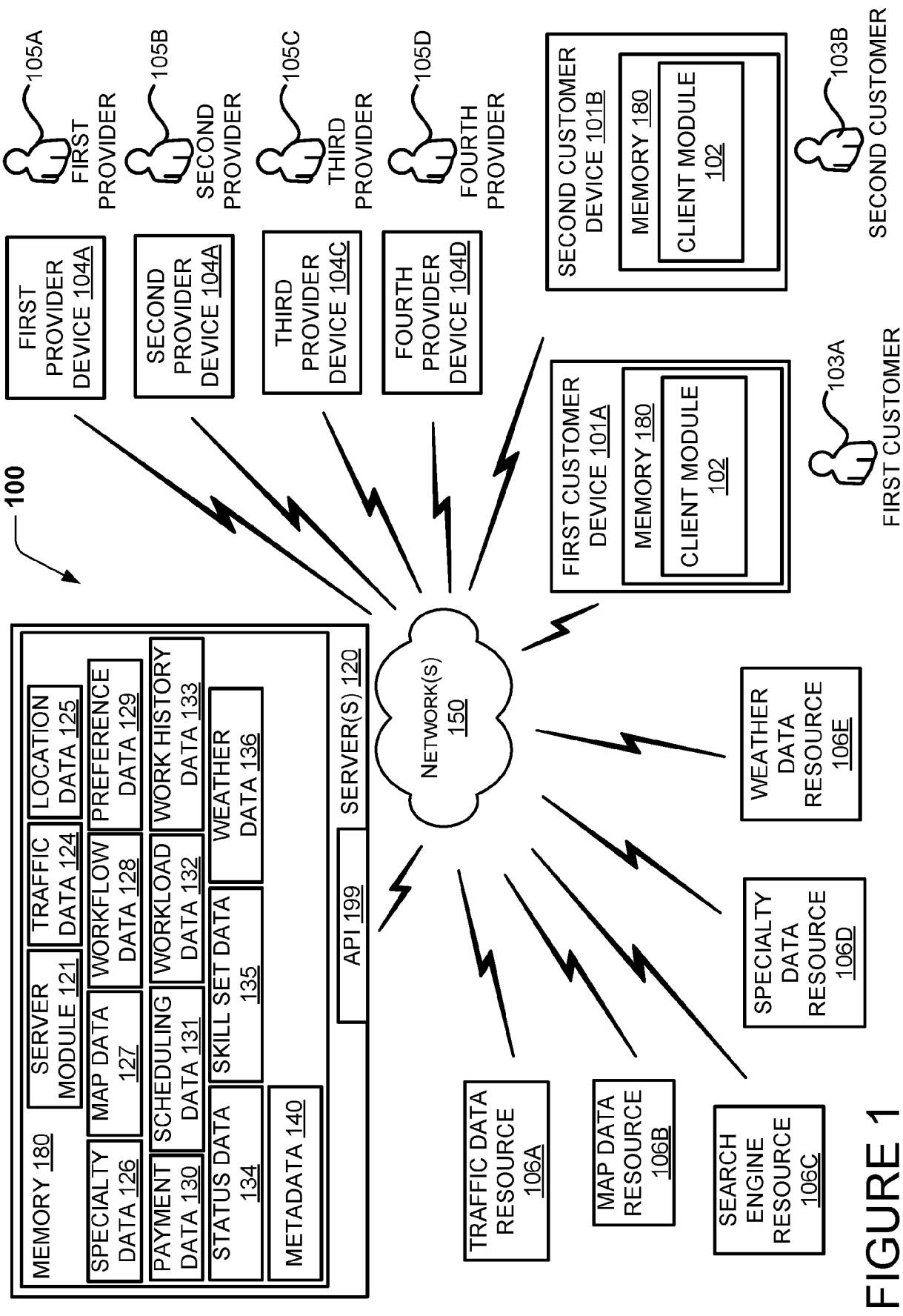
100
105A
FIRST PROVIDER
105B
SECOND PROVIDER
105C
THIRD PROVIDER
105D
FOURTH PROVIDER
FIRST PROVIDER DEVICE 104A
SECOND PROVIDER DEVICE 104A
THIRD PROVIDER DEVICE 104C
FOURTH PROVIDER DEVICE 104D
SECOND CUSTOMER DEVICE 101B
MEMORY 180
CLIENT MODULE 102
103B
SECOND CUSTOMER
FIRST CUSTOMER DEVICE 101A
MEMORY 180
CLIENT MODULE 102
103A
FIRST CUSTOMER
NETWORK(S) 150
MEMORY 180
SERVER MODULE 121
TRAFFIC DATA 124
LOCATION DATA 125
SPECIALTY DATA 126
MAP DATA 127
WORKFLOW DATA 128
PREFERENCE DATA 129
PAYMENT DATA 130
SCHEDULING DATA 131
WORKLOAD DATA 132
WORK HISTORY DATA 133
STATUS DATA 134
SKILL SET DATA 135
WEATHER DATA 136
METADATA 140
API 199
SERVER(S) 120
TRAFFIC DATA RESOURCE 106A
MAP DATA RESOURCE 106B
SEARCH ENGINE RESOURCE 106C
SPECIALTY DATA RESOURCE 106D
WEATHER DATA RESOURCE 106E

FIGURE 1

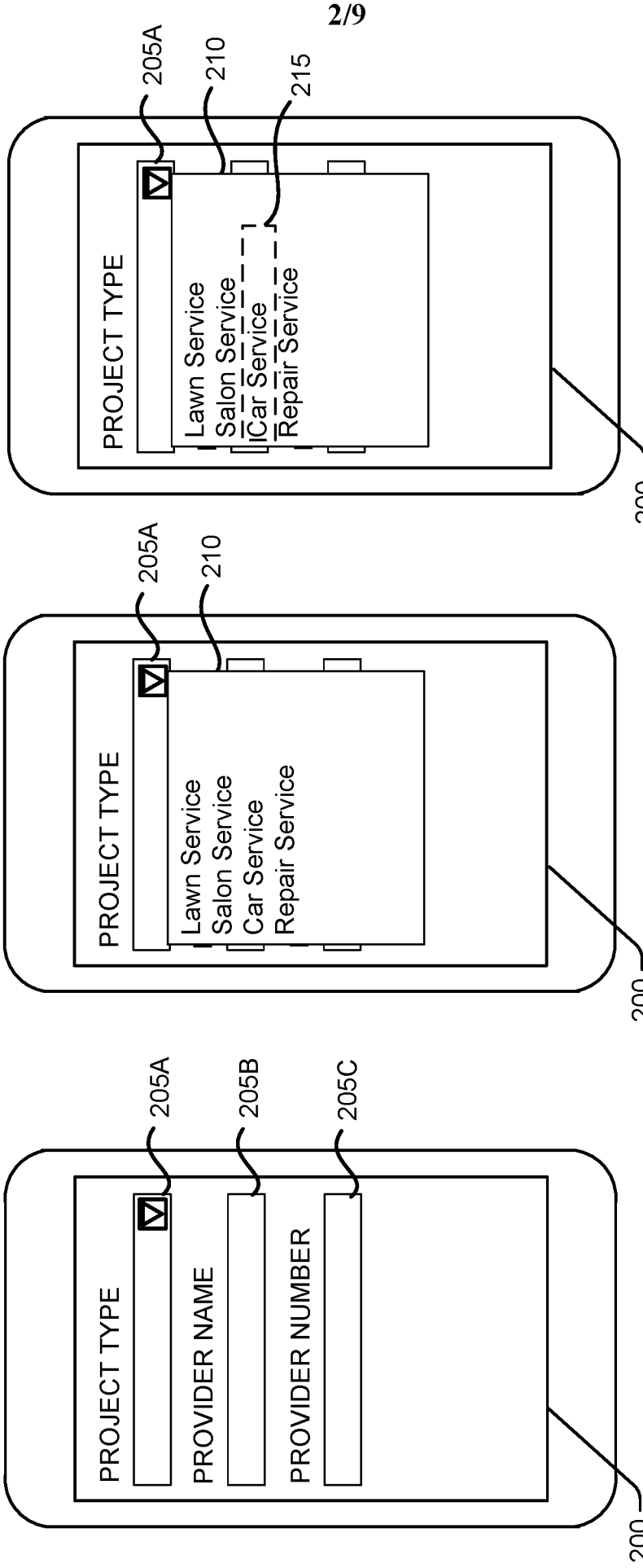

FIGURE 2A

FIGURE 2B

FIGURE 2C

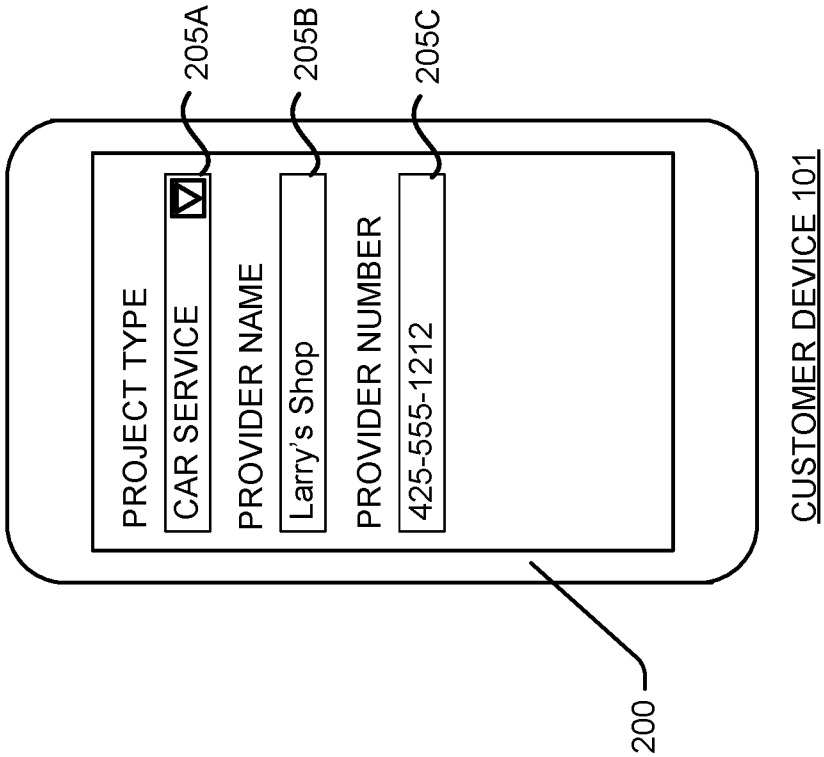

FIGURE 2E

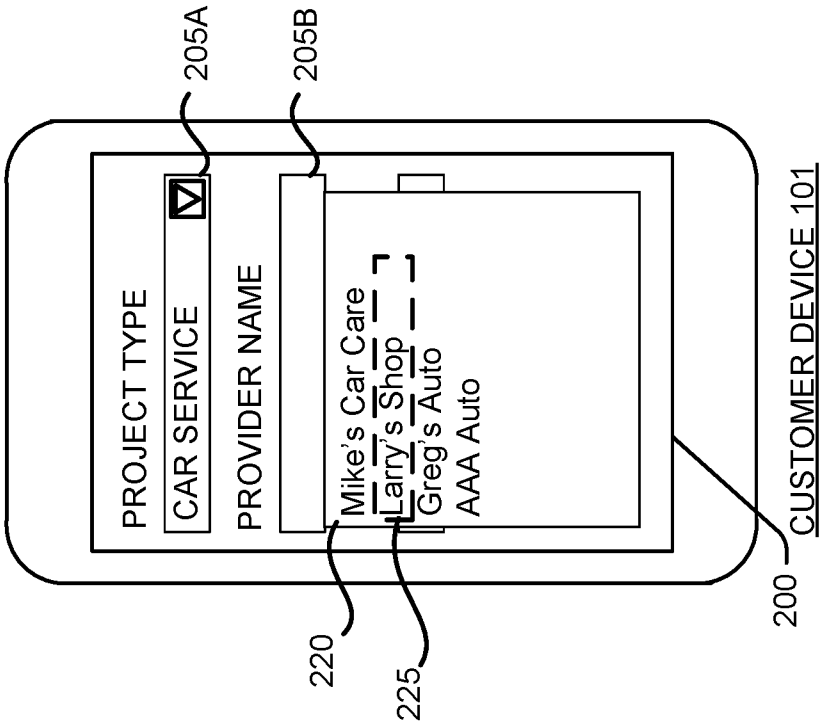

FIGURE 2D

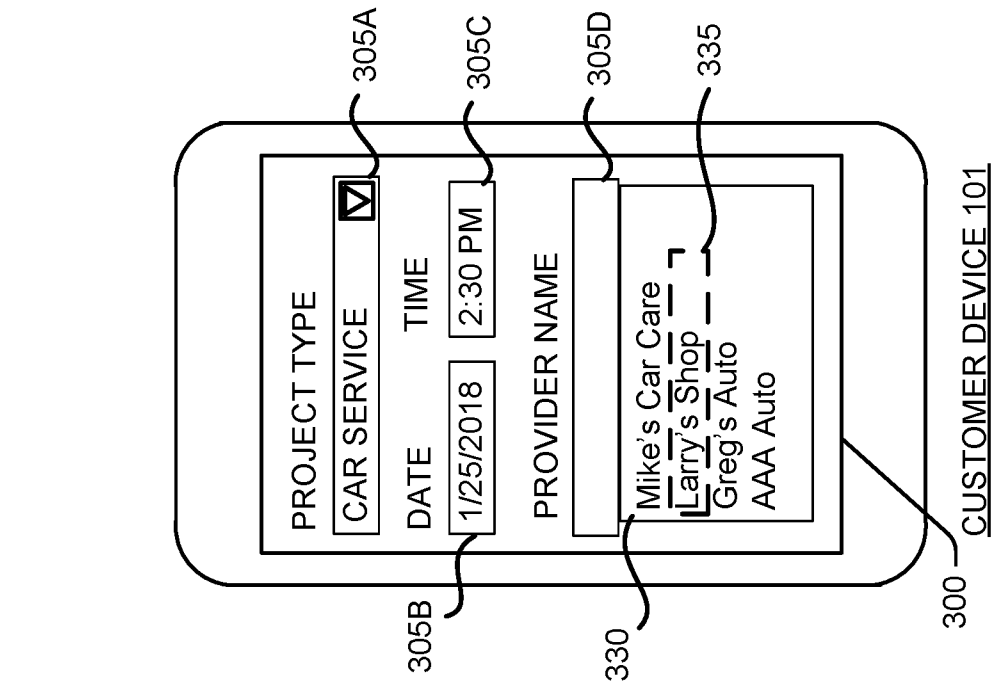

FIGURE 3B

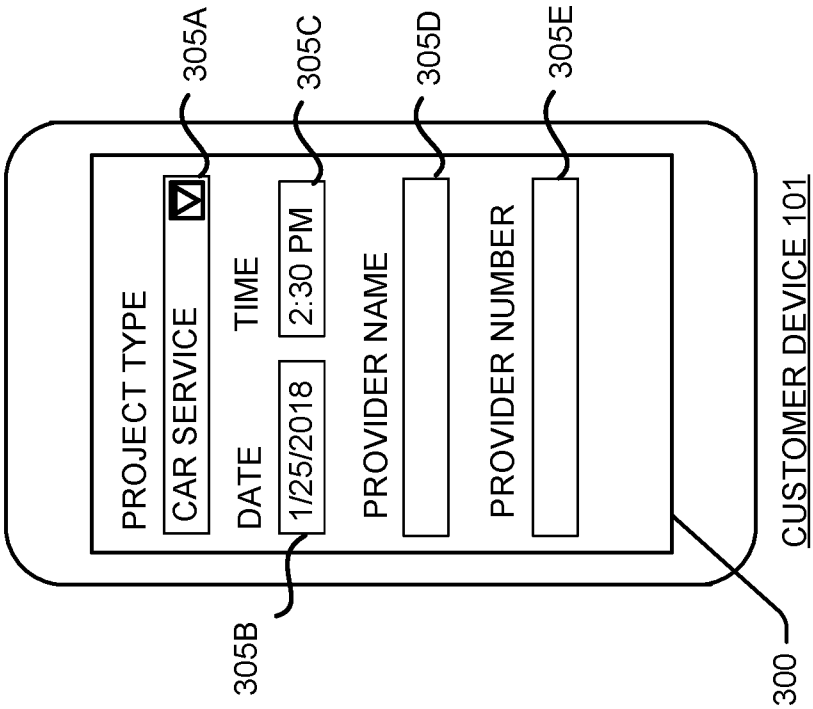

FIGURE 3A

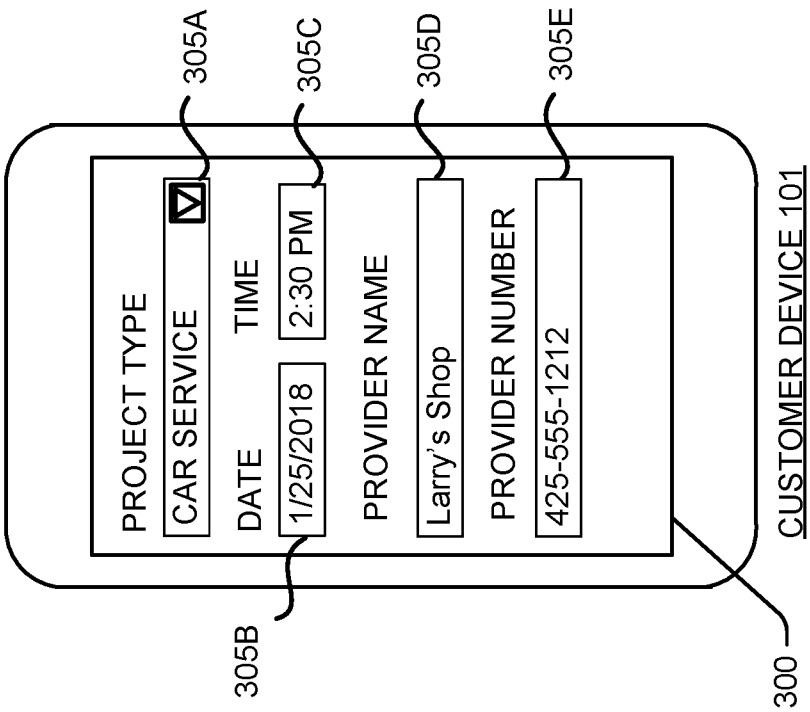
305A
305C
305D
305E
PROJECT TYPE
CAR SERVICE
DATE
TIME
1/25/2018
2:30 PM
PROVIDER NAME
Larry's Shop
PROVIDER NUMBER
425-555-1212
305B
300
CUSTOMER DEVICE 101

FIGURE 3C

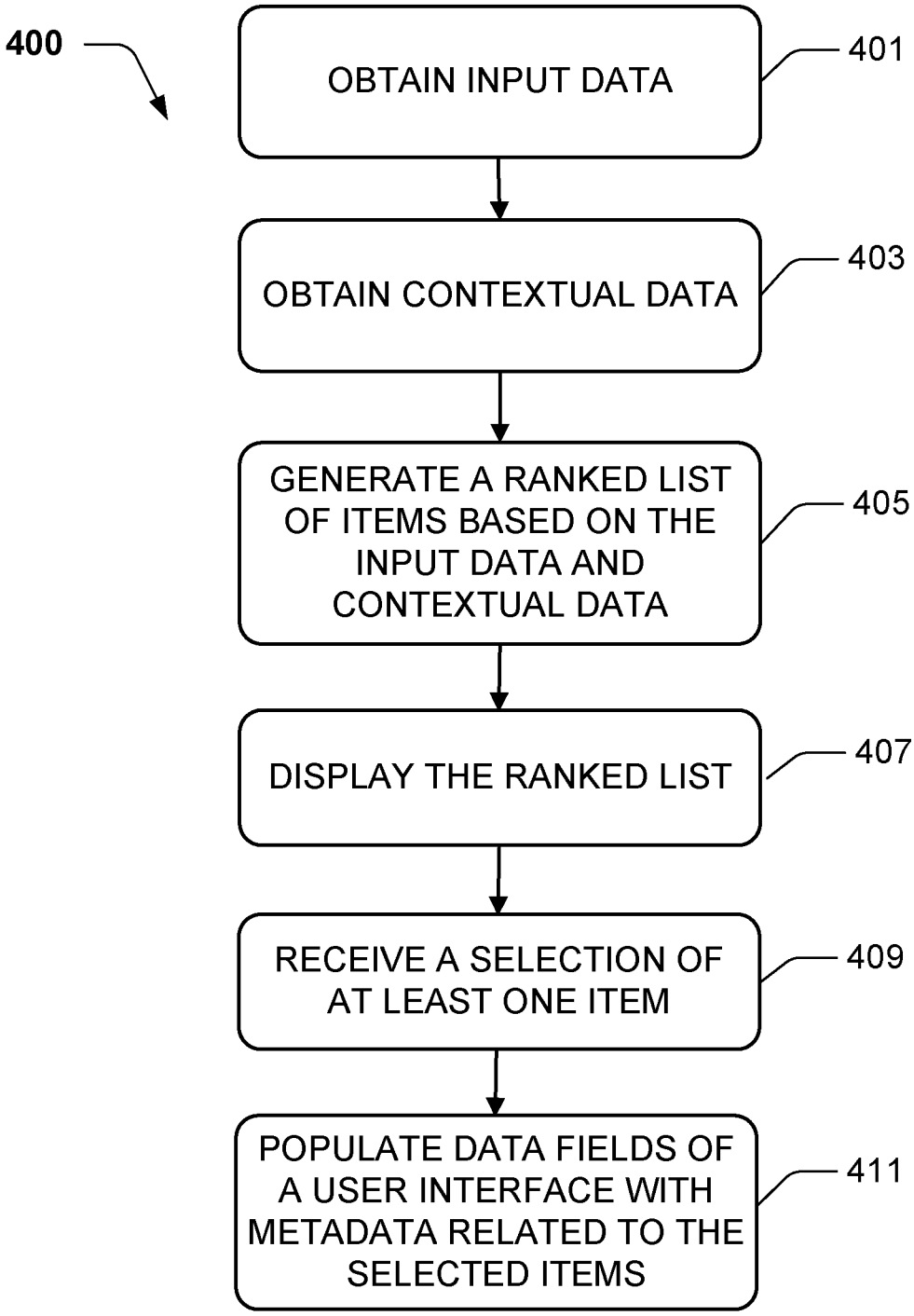
400
OBTAIN INPUT DATA
401
OBTAIN CONTEXTUAL DATA
403
GENERATE A RANKED LIST OF ITEMS BASED ON THE INPUT DATA AND CONTEXTUAL DATA
405
DISPLAY THE RANKED LIST
407
RECEIVE A SELECTION OF AT LEAST ONE ITEM
409
POPULATE DATA FIELDS OF A USER INTERFACE WITH METADATA RELATED TO THE SELECTED ITEMS
411

FIGURE 4

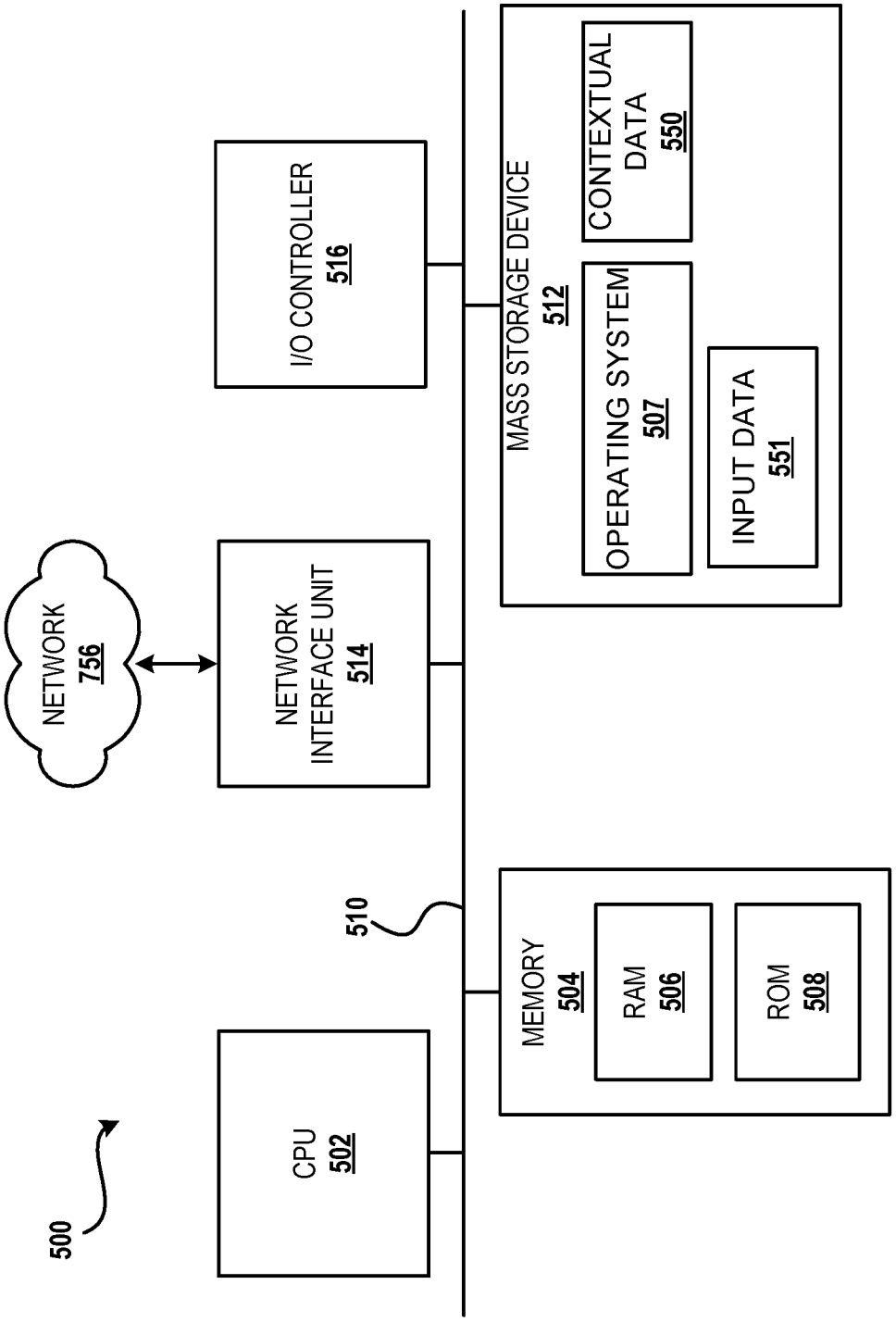
500
CPU
502
510
MEMORY
504
RAM
506
ROM
508
NETWORK
INTERFACE UNIT
514
NETWORK
756
I/O CONTROLLER
516
MASS STORAGE DEVICE
512
OPERATING SYSTEM
507
CONTEXTUAL
DATA
550
INPUT DATA
551

FIGURE 5

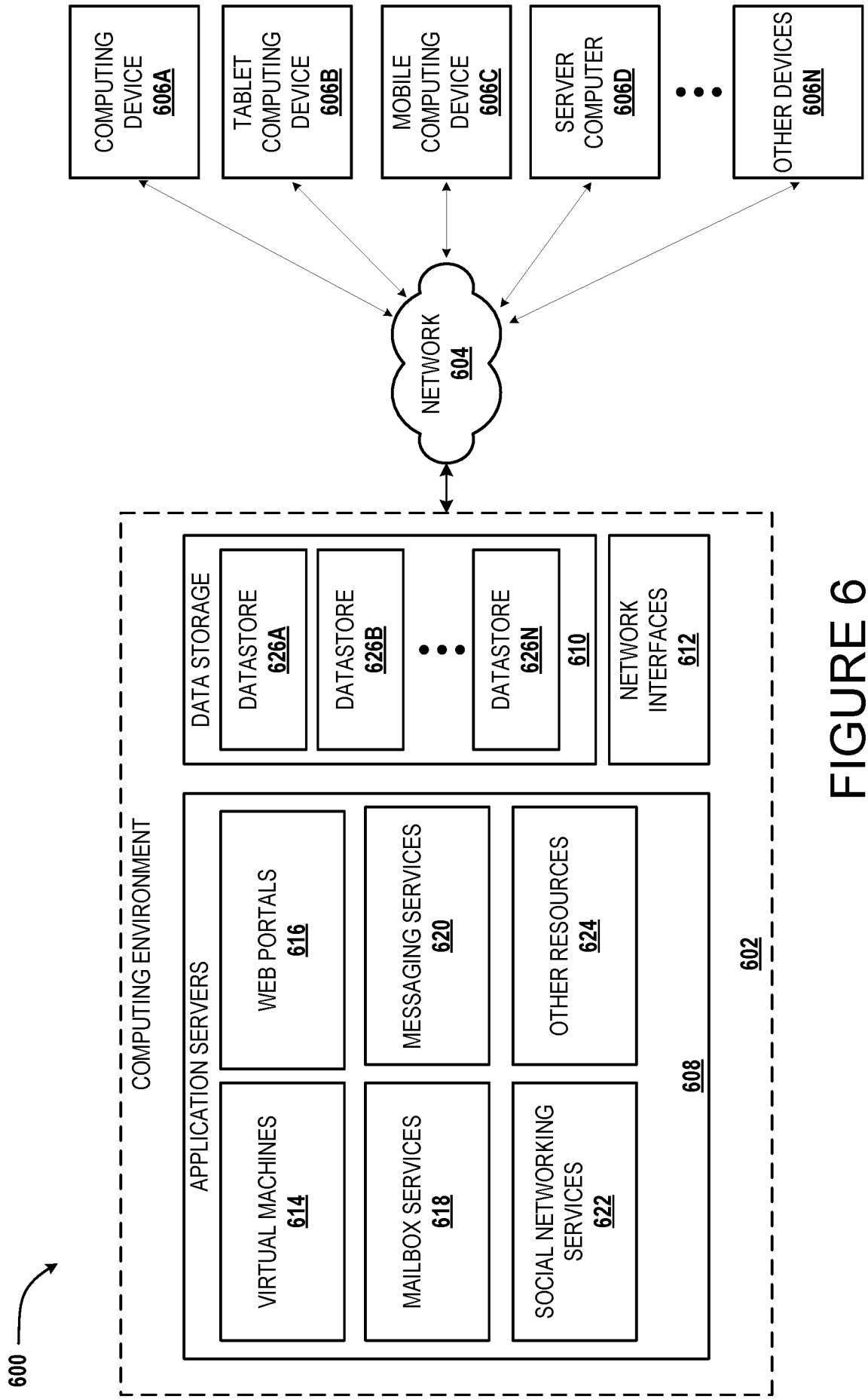
600
COMPUTING ENVIRONMENT
602
APPLICATION SERVERS
608
VIRTUAL MACHINES 614
WEB PORTALS 616
MAILBOX SERVICES 618
MESSAGING SERVICES 620
SOCIAL NETWORKING SERVICES 622
OTHER RESOURCES 624
DATA STORAGE
DATASTORE 626A
DATASTORE 626B
DATASTORE 626N
610
NETWORK INTERFACES 612
NETWORK 604
COMPUTING DEVICE 606A
TABLET COMPUTING DEVICE 606B
MOBILE COMPUTING DEVICE 606C
SERVER COMPUTER 606D
OTHER DEVICES 606N

FIGURE 6

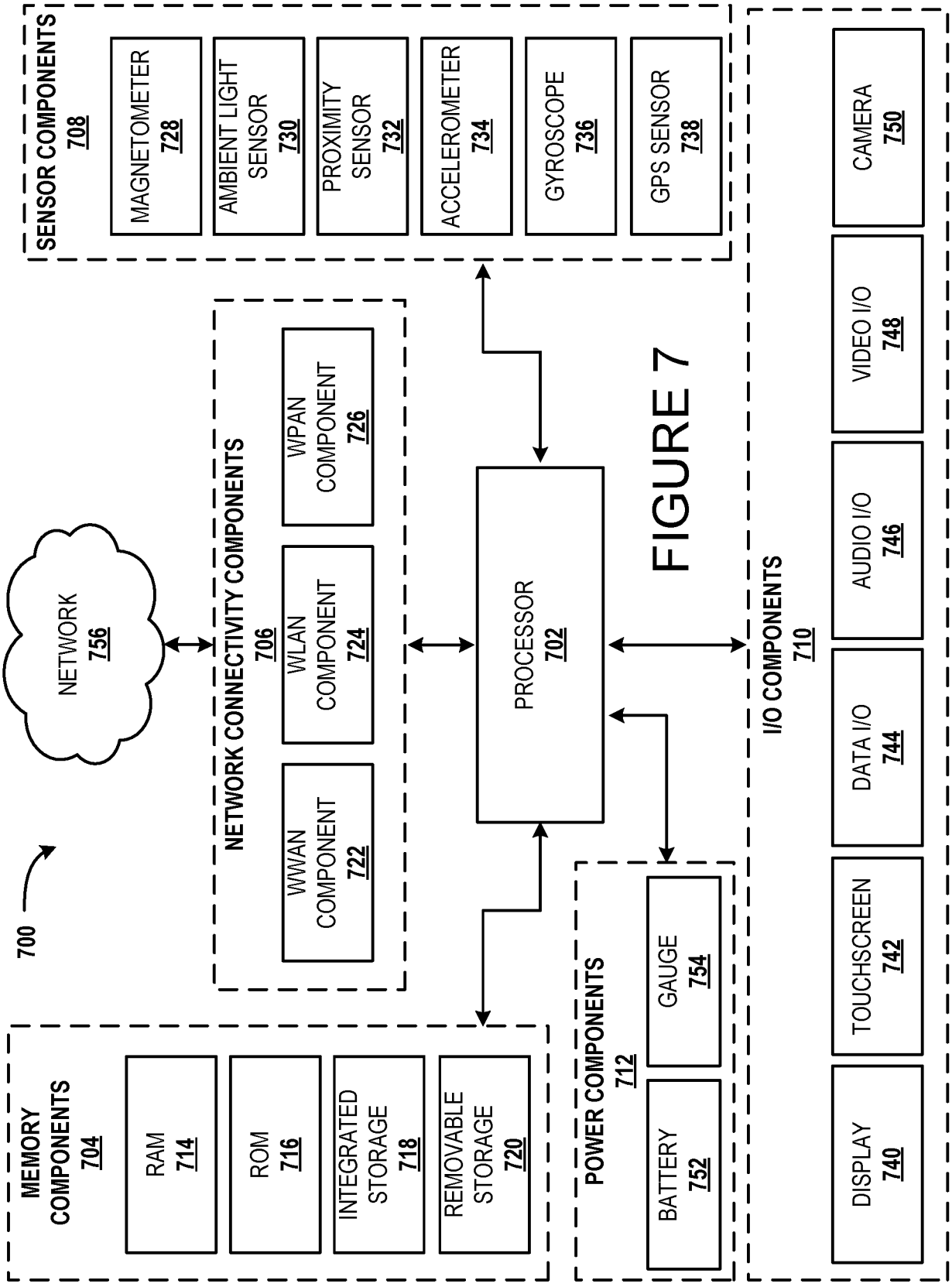
700
NETWORK 756
SENSOR COMPONENTS 708
MAGNETOMETER 728
AMBIENT LIGHT SENSOR 730
PROXIMITY SENSOR 732
ACCELEROMETER 734
GYROSCOPE 736
GPS SENSOR 738
NETWORK CONNECTIVITY COMPONENTS 706
WWAN COMPONENT 722
WLAN COMPONENT 724
WPAN COMPONENT 726
PROCESSOR 702
MEMORY COMPONENTS 704
RAM 714
ROM 716
INTEGRATED STORAGE 718
REMOVABLE STORAGE 720
POWER COMPONENTS 712
BATTERY 752
GAUGE 754
I/O COMPONENTS 710
DISPLAY 740
TOUCHSCREEN 742
DATA I/O 744
AUDIO I/O 746
VIDEO I/O 748
CAMERA 750

FIGURE 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2017/028705

A. CLASSIFICATION OF SUBJECT MATTER
INV. G06F17/24 G06F17/27 G06Q10/06
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)
G06F 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 2014/229258 A1 (SERIANI MALAK [US]) 14 August 2014 (2014-08-14) paragraphs [0034] - [0050]; figures 2-5	1-15
X	US 2009/313077 A1 (WHEELER IV GEORGE Y [US]) 17 December 2009 (2009-12-17) paragraphs [0046] - [0056]	1-15
X	US 9 282 430 B1 (BRANDMAIER JENNIFER A [US] ET AL) 8 March 2016 (2016-03-08) column 12, line 32 - column 16, line 13; claim 21; figure 4	1-15

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

☒ See patent family annex.

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"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

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"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
17 July 2017	26/07/2017

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	Alt, Susanne

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2017/028705

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014229258 A1	14-08-2014	NONE	
US 2009313077 A1	17-12-2009	NONE	
US 9282430 B1	08-03-2016	US 9282430 B1	08-03-2016
		US 9672520 B1	06-06-2017