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(54) **SYSTEMS AND METHODS FOR PROVIDING A CONTEXTUAL USER INTERFACE ELEMENT**

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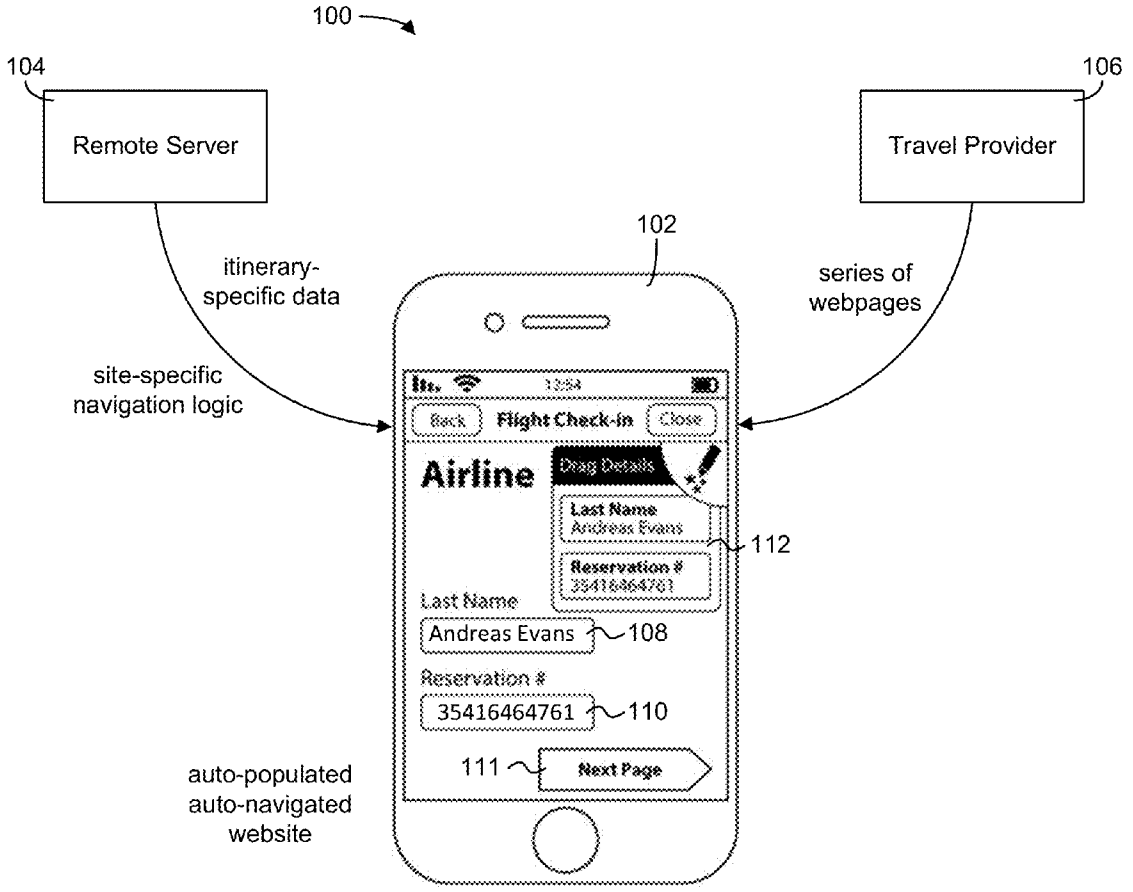
(57) **ABSTRACT**

Systems and methods for providing a contextual user interface element are provided. A described system includes a user device configured to receive, from a remote server, itinerary-specific data relating to a particular travel itinerary and information for accessing a travel website for performing a travel-related action. The user device is configured to present the itinerary-specific data in a contextual user interface element on the user device concurrently with a web page of the travel website for performing the travel-related action. The itinerary-specific data are presented as selectable data elements within the contextual user interface element. The user device is configured to receive a user selection of a selectable data element and to execute instructions for copying the itinerary-specific data from the contextual user interface element to a form field of the travel website in response to the user selection.



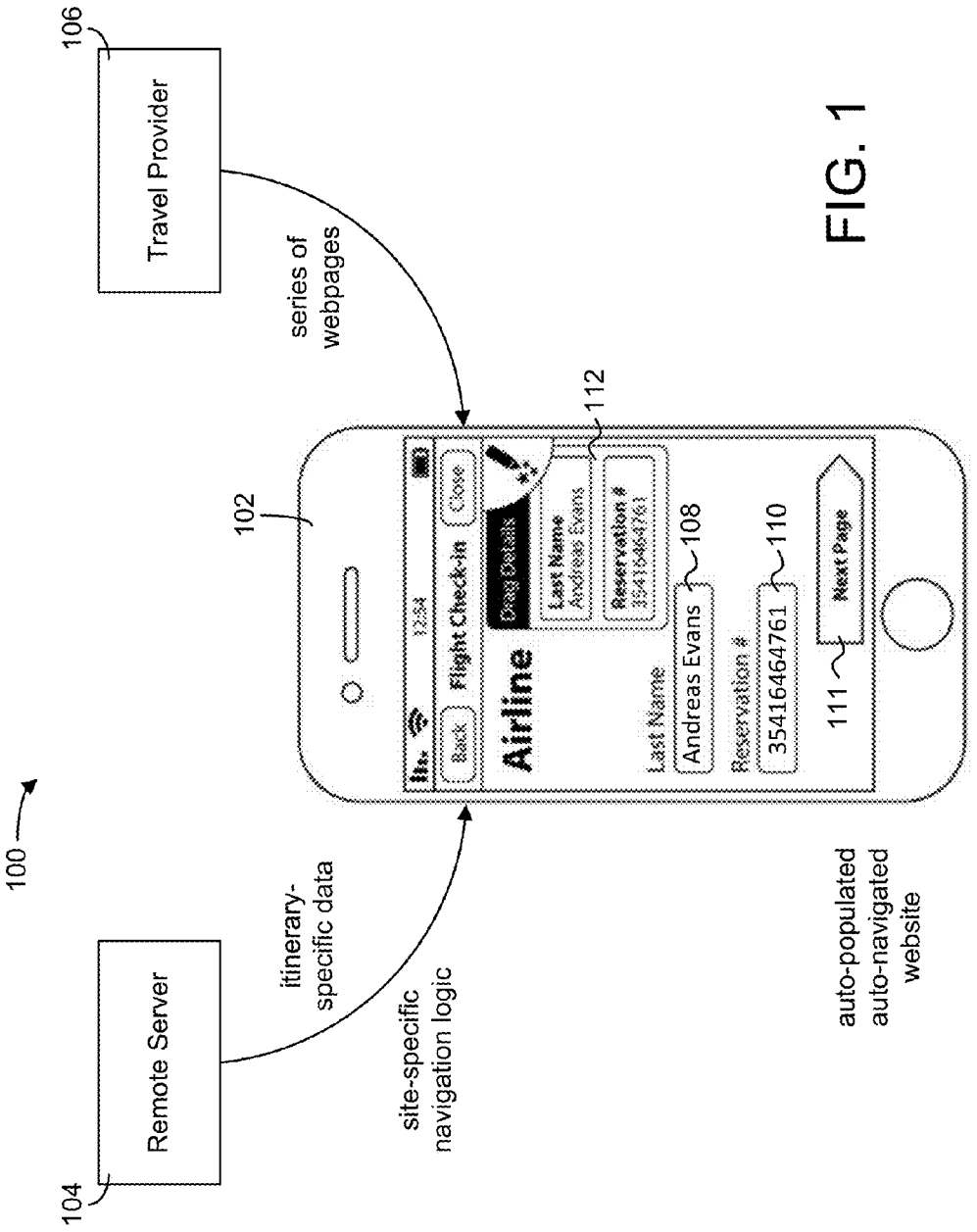

100
102
104
Remote Server
106
Travel Provider
series of webpages
itinerary-specific data
site-specific navigation logic
auto-populated auto-navigated website
Back
Flight Check-in
Close
Airline
Drag Details
Last Name
Andreas Evans
Reservation #
3541646476
Last Name
Andreas Evans
Reservation #
3541646476
Next Page
108
110
111
112

FIG. 1

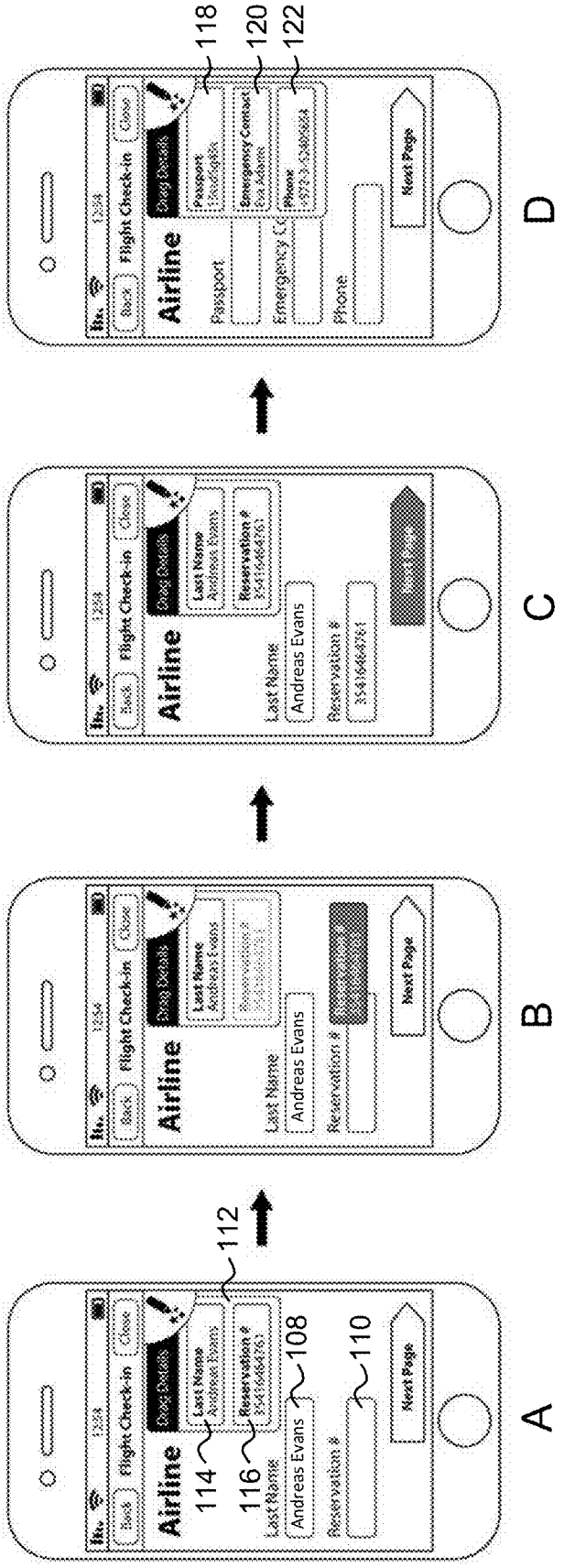

A
B
C
D
Airline
Flight Check-in
Back
Close
Bag Details
Last Name
Andreas Evans
Reservation #
Next Page
Passport
Emergency Contact
Phone
112
114
116
108
110
118
120
122

FIG. 2

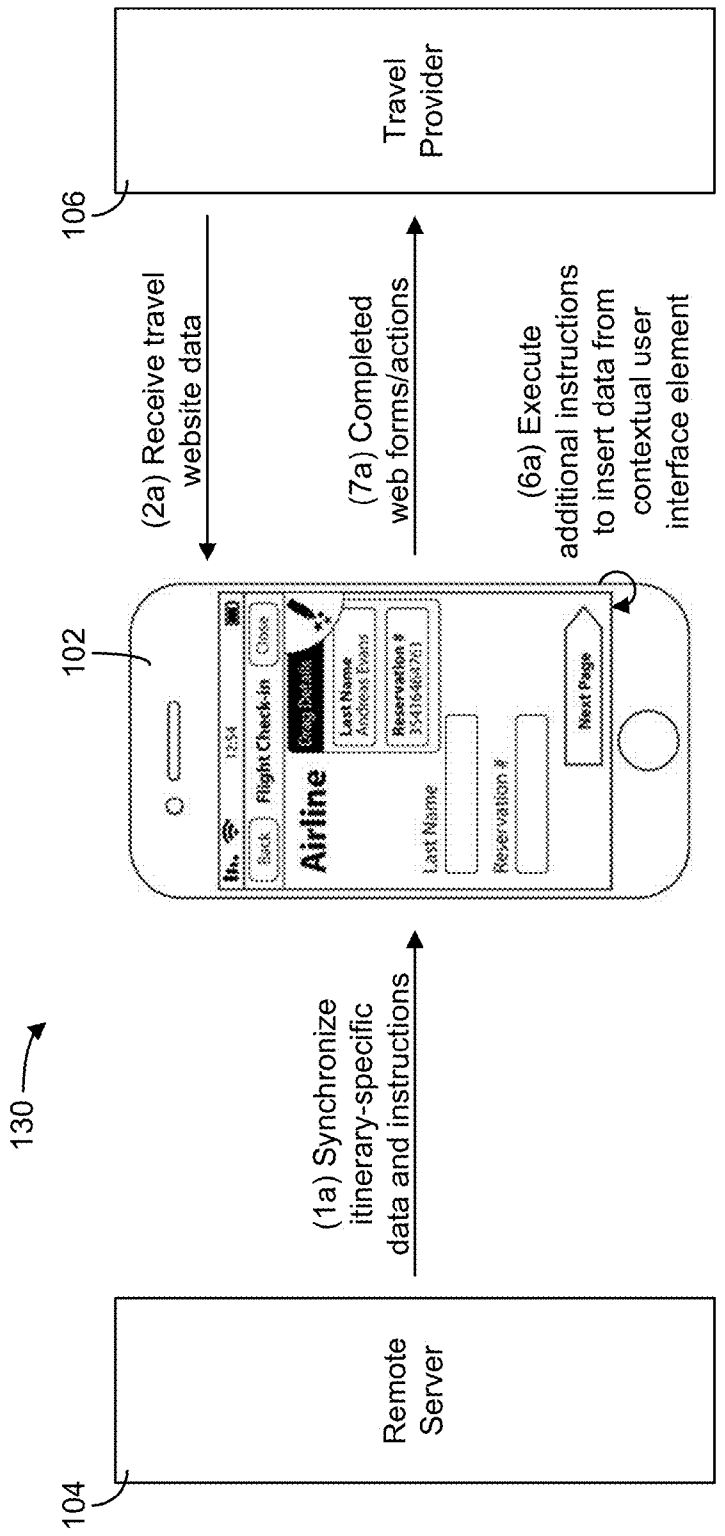

130
104
Remote Server
106
Travel Provider
102
(1a) Synchronize itinerary-specific data and instructions
(2a) Receive travel website data
(3a) Load travel website data
(4a) Inject instructions into website data and execute instructions
(5a) Present contextual user interface element
(6a) Execute additional instructions to insert data from contextual user interface element
(7a) Completed web forms/actions
Airline
Flight Check-in
Back
Close
Last Name
Reservation #
Next Page

FIG. 3A

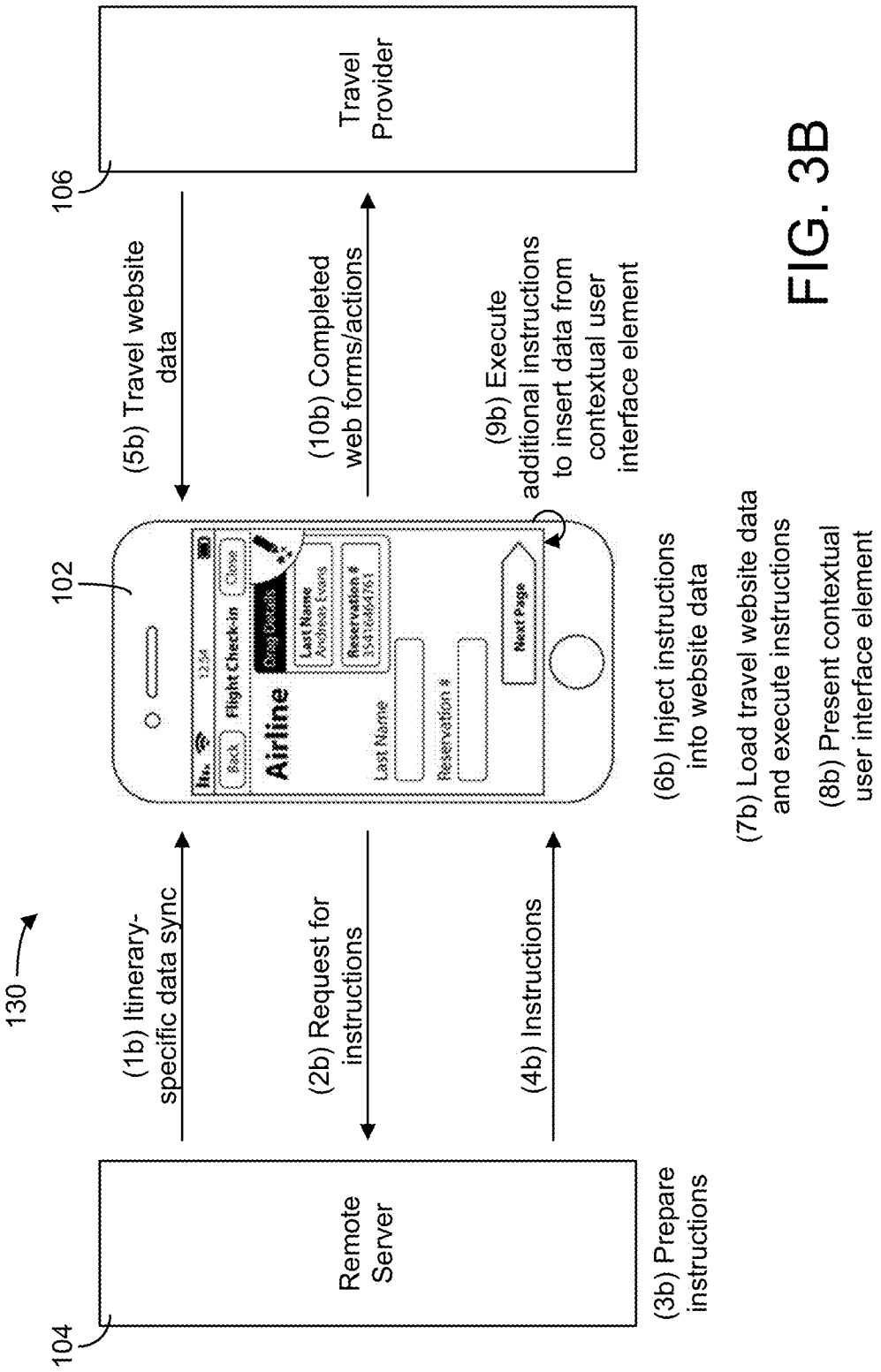

130
104
Remote Server
106
Travel Provider
102
Airline
Flight Check-in
Back
Close
Drag Details
Last Name
Reservation #
Next Page
(1b) Itinerary-specific data sync
(2b) Request for instructions
(4b) Instructions
(5b) Travel website data
(10b) Completed web forms/actions
(9b) Execute additional instructions to insert data from contextual user interface element
(3b) Prepare instructions
(6b) Inject instructions into website data
(7b) Load travel website data and execute instructions
(8b) Present contextual user interface element

FIG. 3B

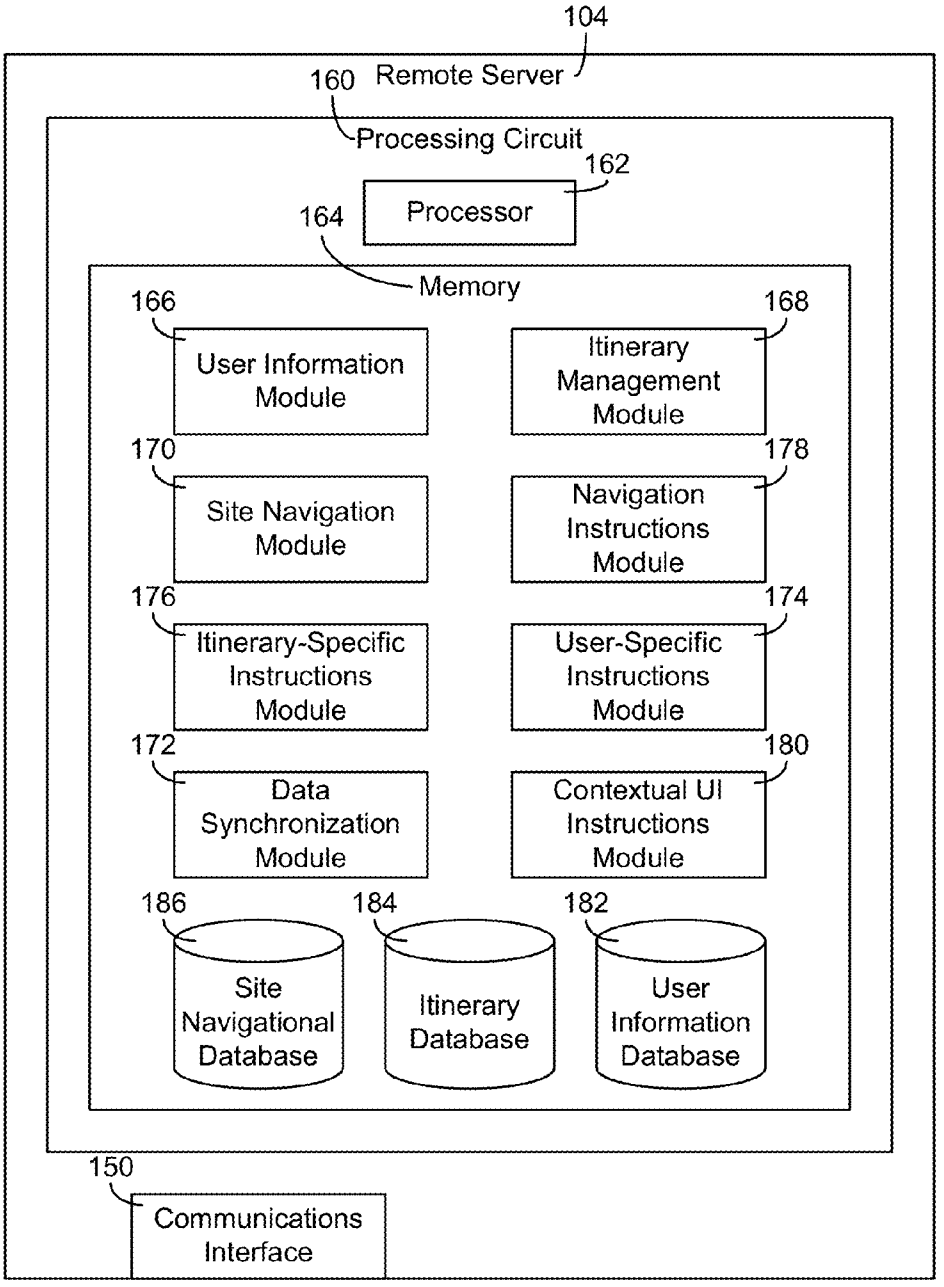

104
160 Remote Server
Processing Circuit
162
Processor
164
Memory
166
User Information Module
168
Itinerary Management Module
170
Site Navigation Module
178
Navigation Instructions Module
176
Itinerary-Specific Instructions Module
174
User-Specific Instructions Module
172
Data Synchronization Module
180
Contextual UI Instructions Module
186
Site Navigational Database
184
Itinerary Database
182
User Information Database
150
Communications Interface

FIG. 4

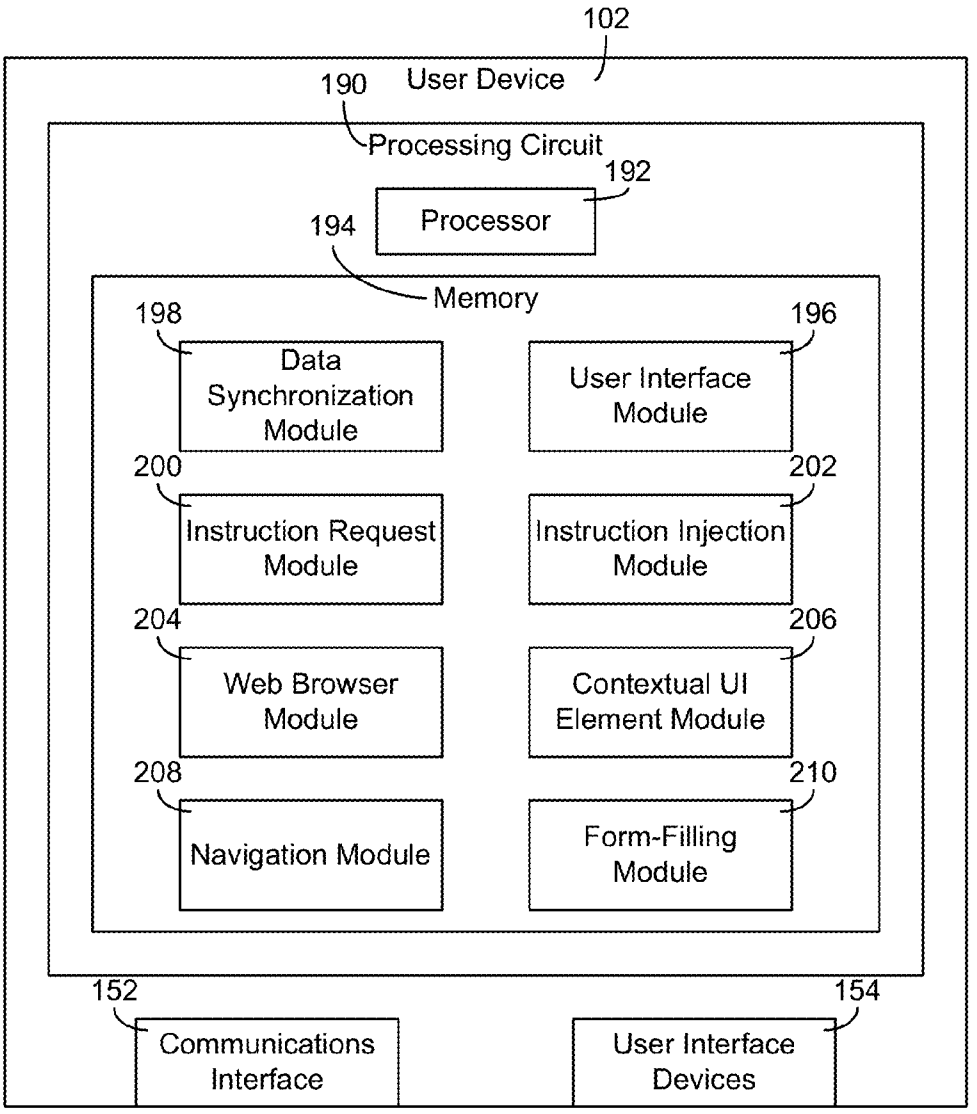

102
190
User Device
Processing Circuit
192
Processor
194
Memory
198
Data Synchronization Module
196
User Interface Module
200
Instruction Request Module
202
Instruction Injection Module
204
Web Browser Module
206
Contextual UI Element Module
208
Navigation Module
210
Form-Filling Module
152
Communications Interface
154
User Interface Devices

FIG. 5

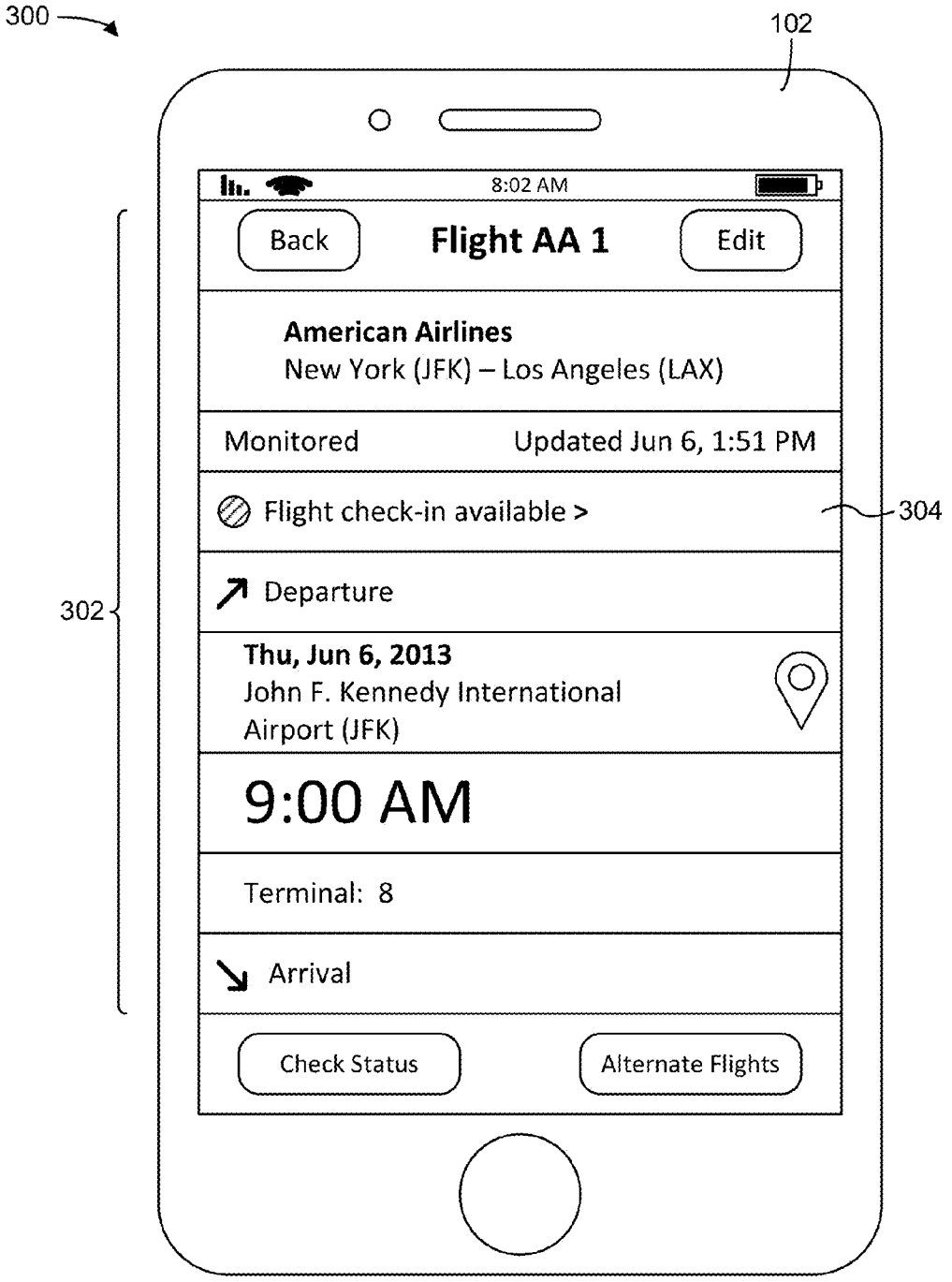

300
102
8:02 AM
Back
Flight AA 1
Edit
American Airlines
New York (JFK) – Los Angeles (LAX)
Monitored
Updated Jun 6, 1:51 PM
Flight check-in available >
304
302
Departure
Thu, Jun 6, 2013
John F. Kennedy International Airport (JFK)
9:00 AM
Terminal: 8
Arrival
Check Status
Alternate Flights

FIG. 6

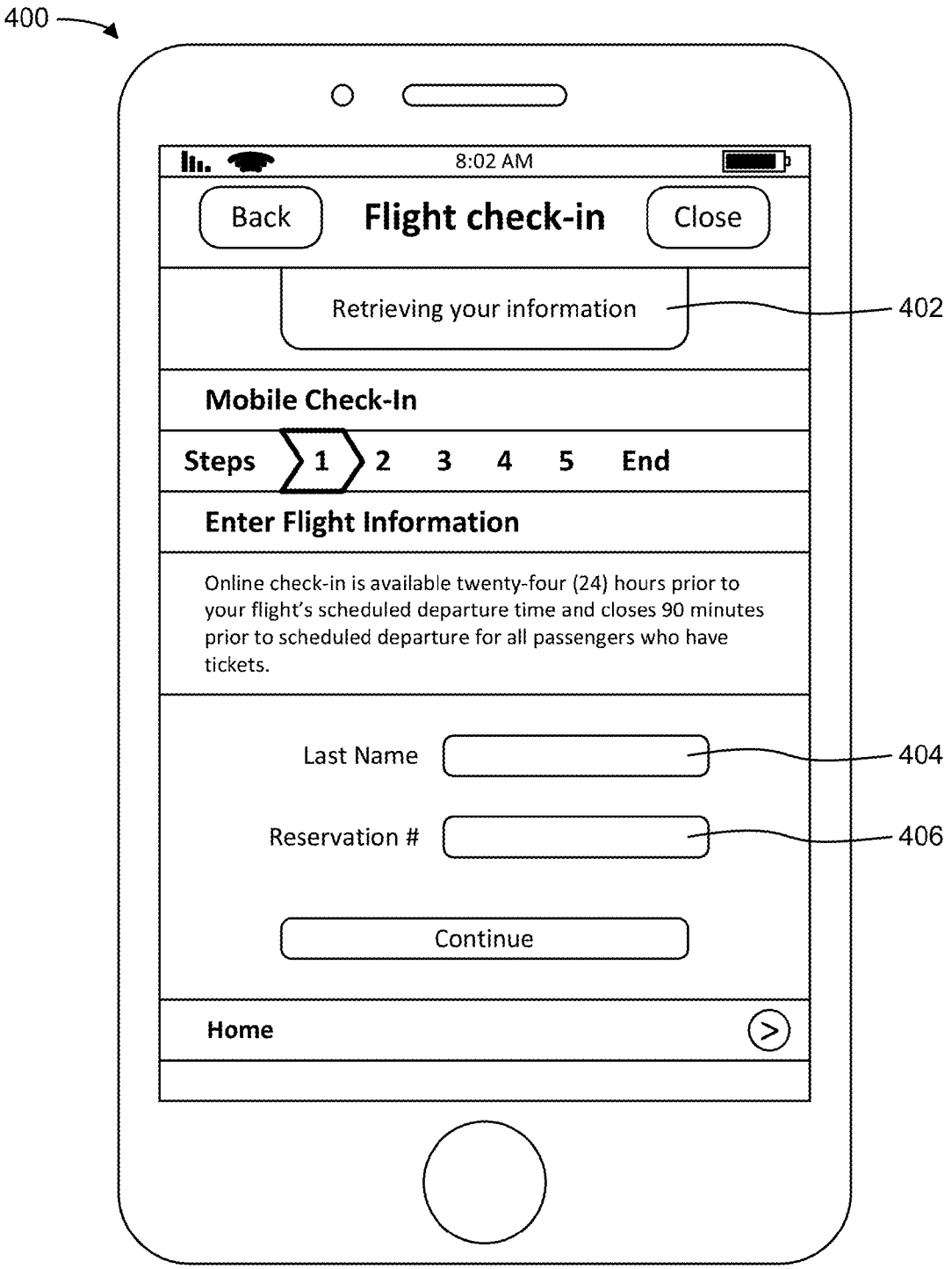

400
8:02 AM
Back
Flight check-in
Close
Retrieving your information
402
Mobile Check-In
Steps
1
2
3
4
5
End
Enter Flight Information
Online check-in is available twenty-four (24) hours prior to your flight's scheduled departure time and closes 90 minutes prior to scheduled departure for all passengers who have tickets.
Last Name
404
Reservation #
406
Continue
Home

FIG. 7

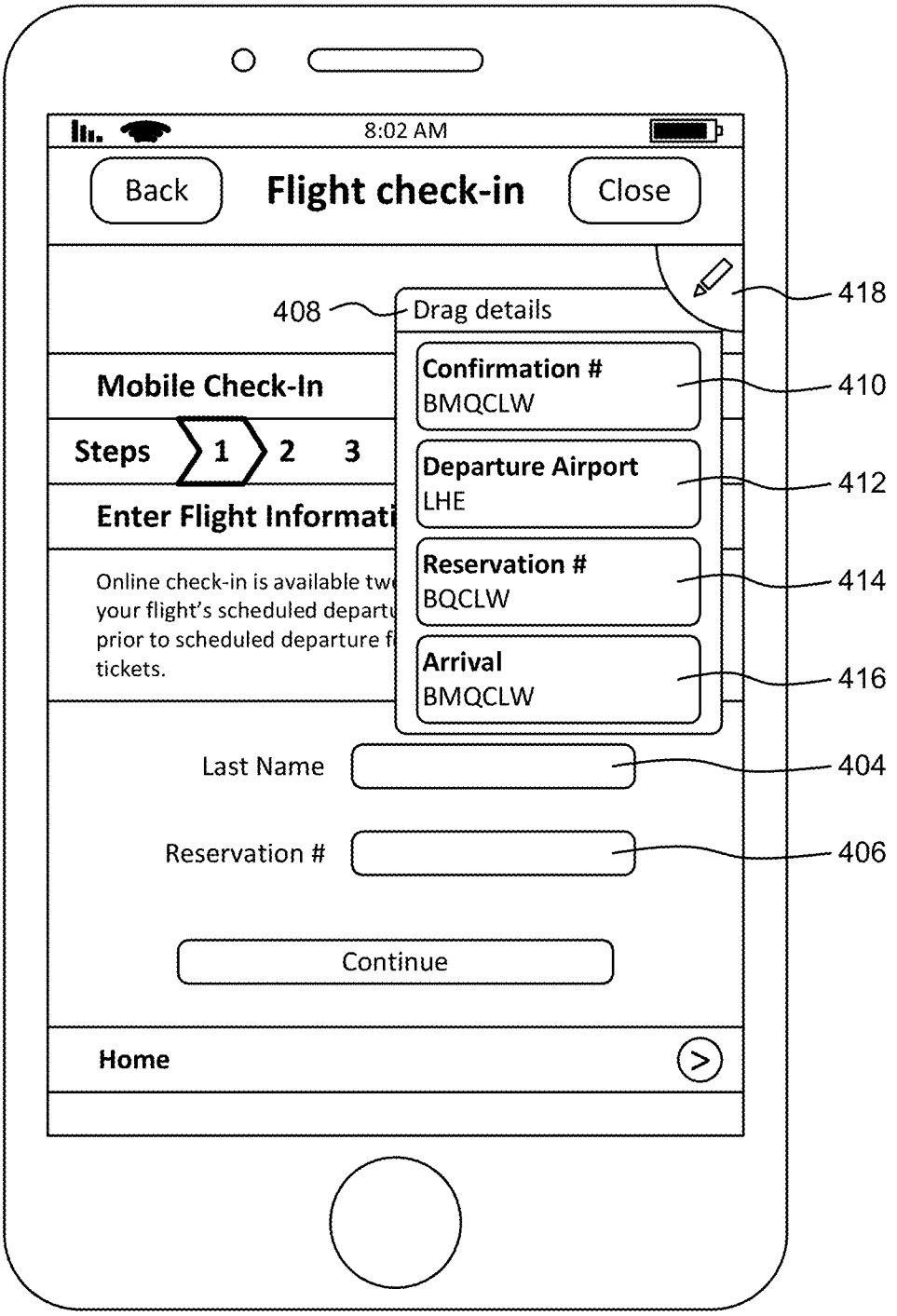

8:02 AM
Back
Flight check-in
Close
408
Drag details
418
Mobile Check-In
Confirmation #
BMQCLW
410
Steps
1
2
3
Departure Airport
LHE
412
Enter Flight Informati
Reservation #
BQCLW
414
Online check-in is available tw
your flight's scheduled departu
prior to scheduled departure f
tickets.
Arrival
BMQCLW
416
Last Name
404
Reservation #
406
Continue
Home

FIG. 8

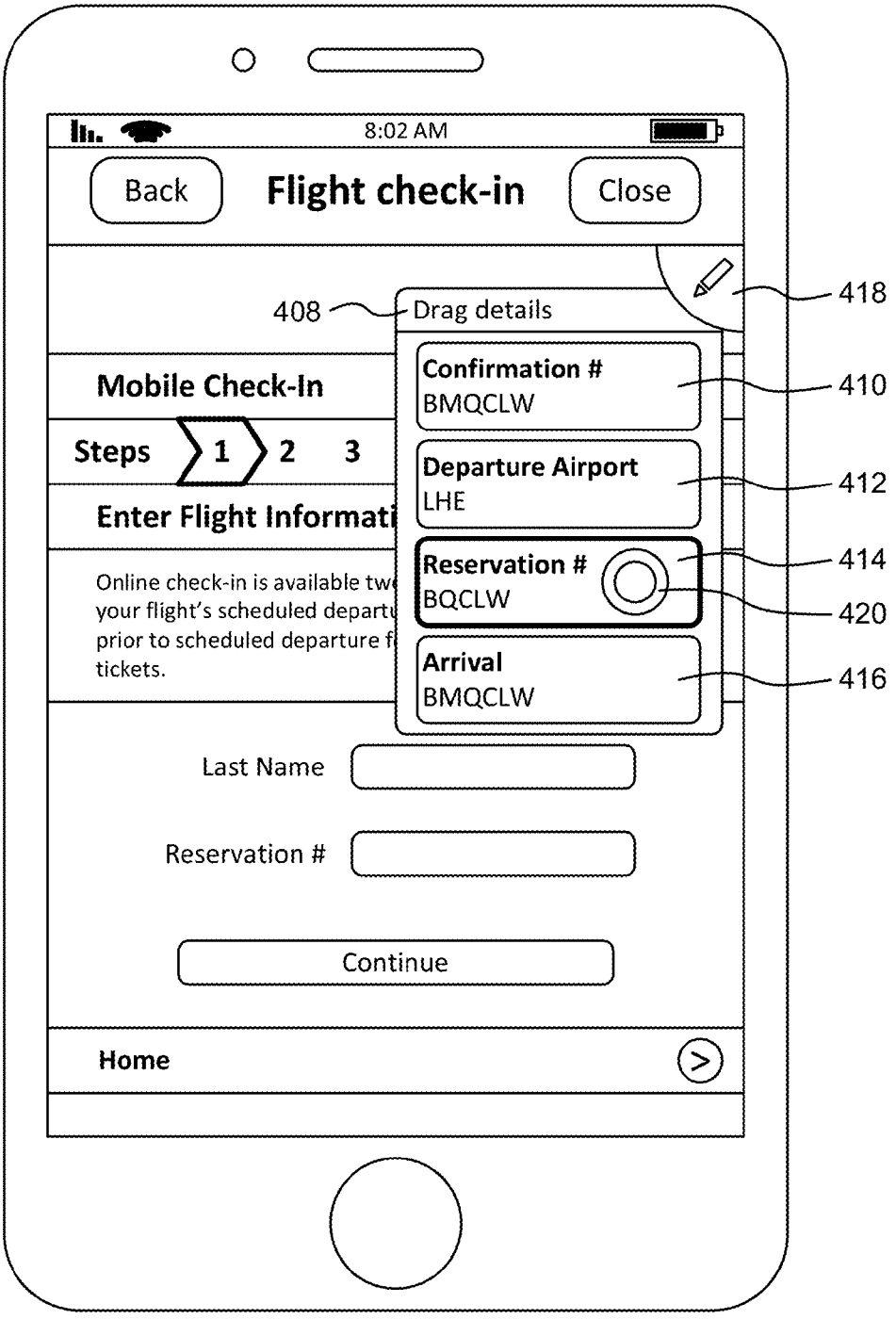

8:02 AM
Back
Flight check-in
Close
408
Drag details
418
Mobile Check-In
Steps
1
2
3
Enter Flight Informati
Online check-in is available tw
your flight's scheduled departu
prior to scheduled departure f
tickets.
Confirmation #
BMQCLW
410
Departure Airport
LHE
412
Reservation #
BQCLW
414
420
Arrival
BMQCLW
416
Last Name
Reservation #
Continue
Home

FIG. 9

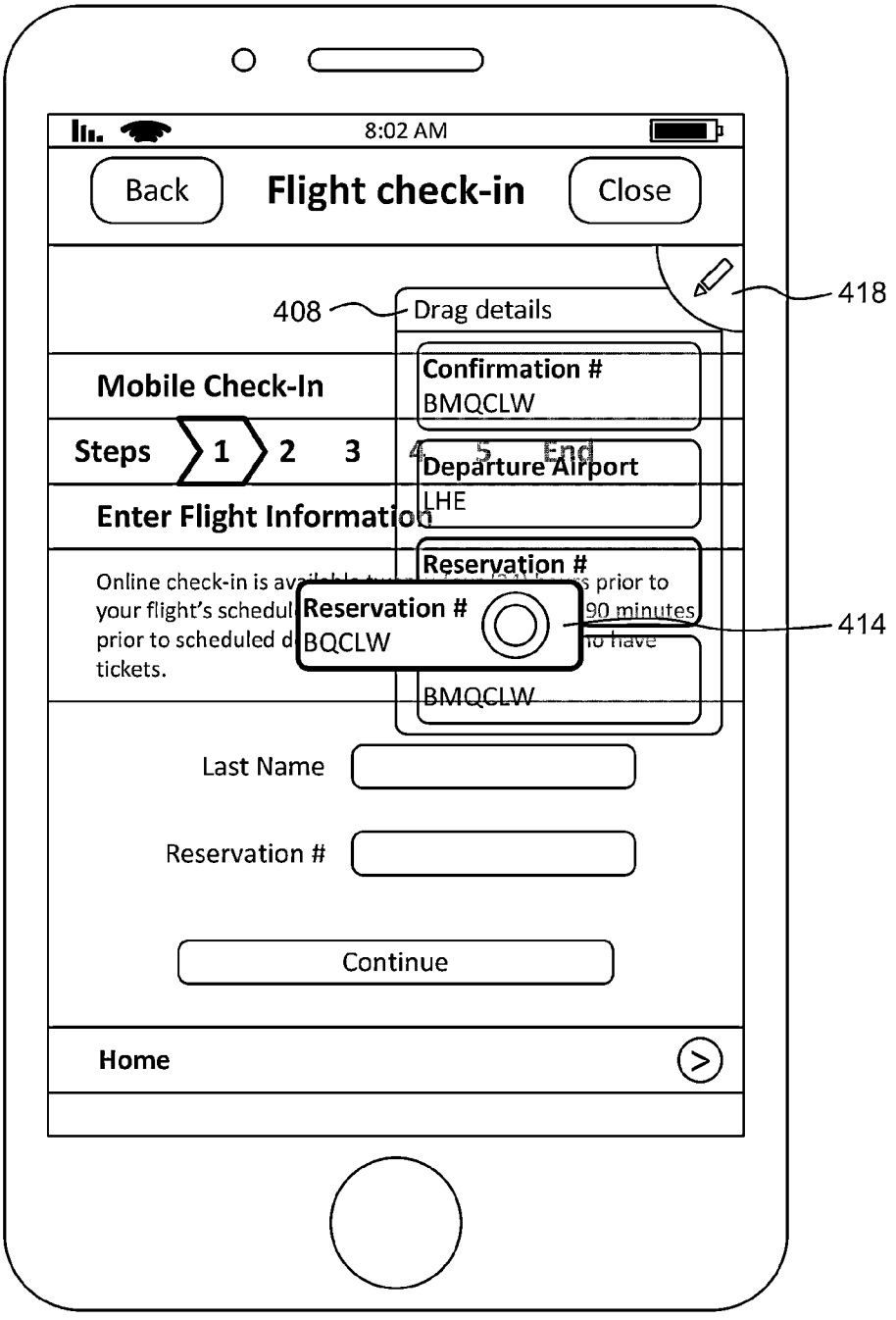

8:02 AM
Back
Flight check-in
Close
408
Drag details
418
Mobile Check-In
Steps
1
2
3
4
5
End
Enter Flight Information
Confirmation #
BMQCLW
Departure Airport
LHE
Reservation #
Online check-in is ava
s prior to
your flight's schedul
90 minutes
prior to scheduled d
o have
tickets.
Reservation #
BQCLW
414
BMQCLW
Last Name
Reservation #
Continue
Home

FIG. 10

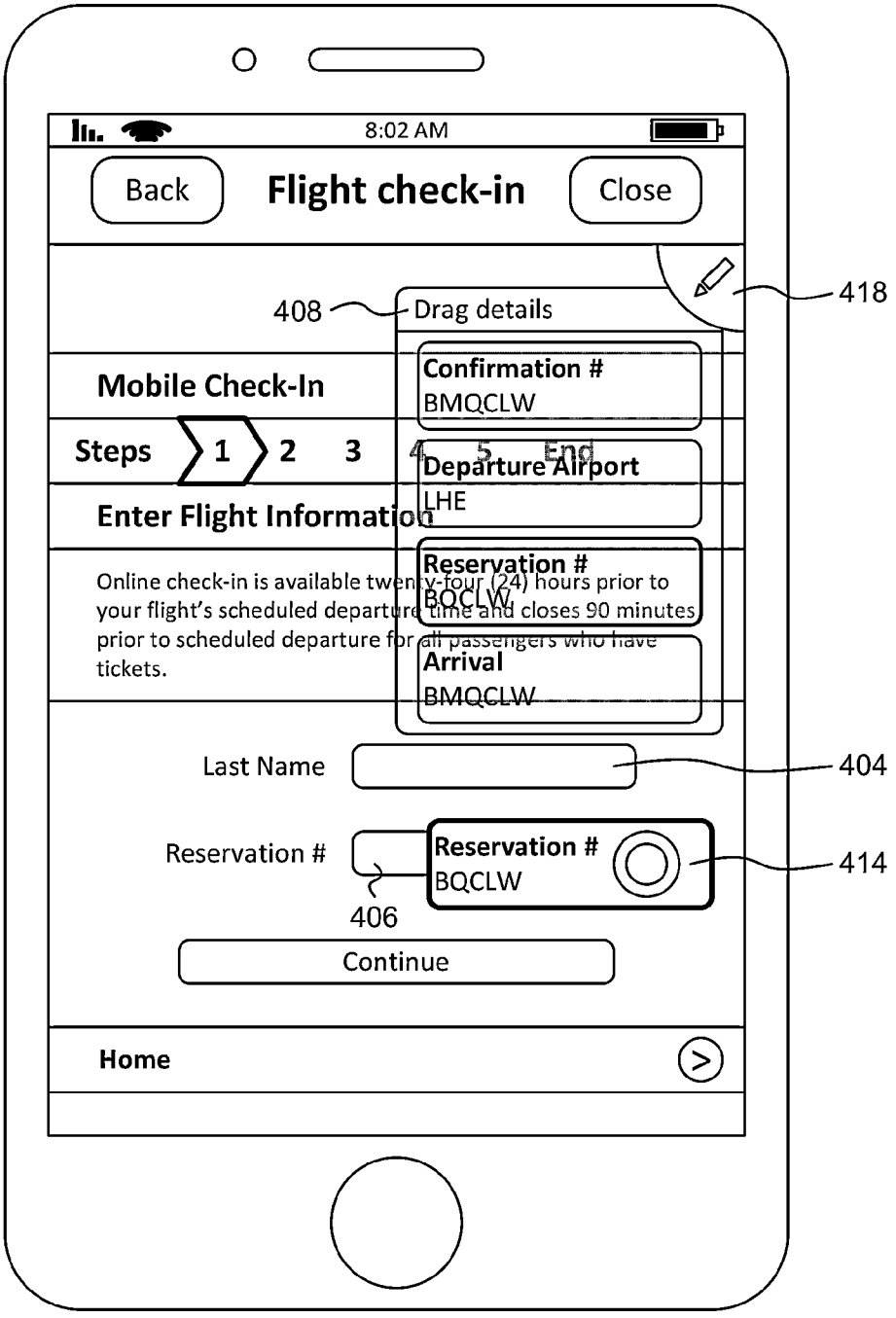

8:02 AM
Back
Flight check-in
Close
408
Drag details
418
Confirmation #
BMQCLW
Mobile Check-In
Steps
1
2
3
4
5
End
Departure Airport
LHE
Enter Flight Information
Reservation #
BQCLW
Online check-in is available twenty-four (24) hours prior to your flight's scheduled departure time and closes 90 minutes prior to scheduled departure for all passengers who have tickets.
Arrival
BMQCLW
Last Name
404
Reservation #
Reservation #
BQCLW
414
406
Continue
Home

FIG. 11

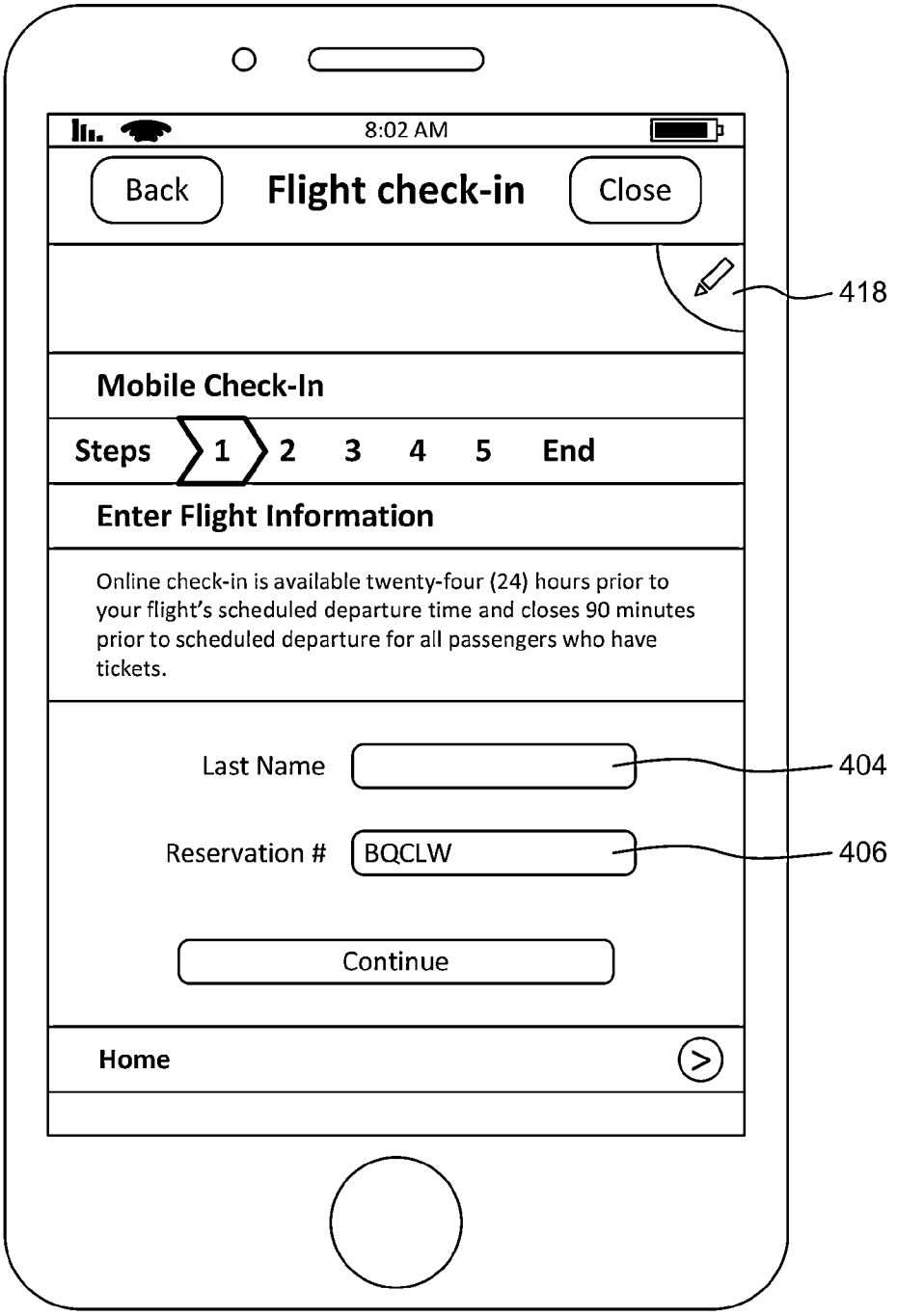

8:02 AM
Back
Flight check-in
Close
418
Mobile Check-In
Steps 1 2 3 4 5 End
Enter Flight Information
Online check-in is available twenty-four (24) hours prior to your flight's scheduled departure time and closes 90 minutes prior to scheduled departure for all passengers who have tickets.
Last Name
404
Reservation #
BQCLW
406
Continue
Home

FIG. 12

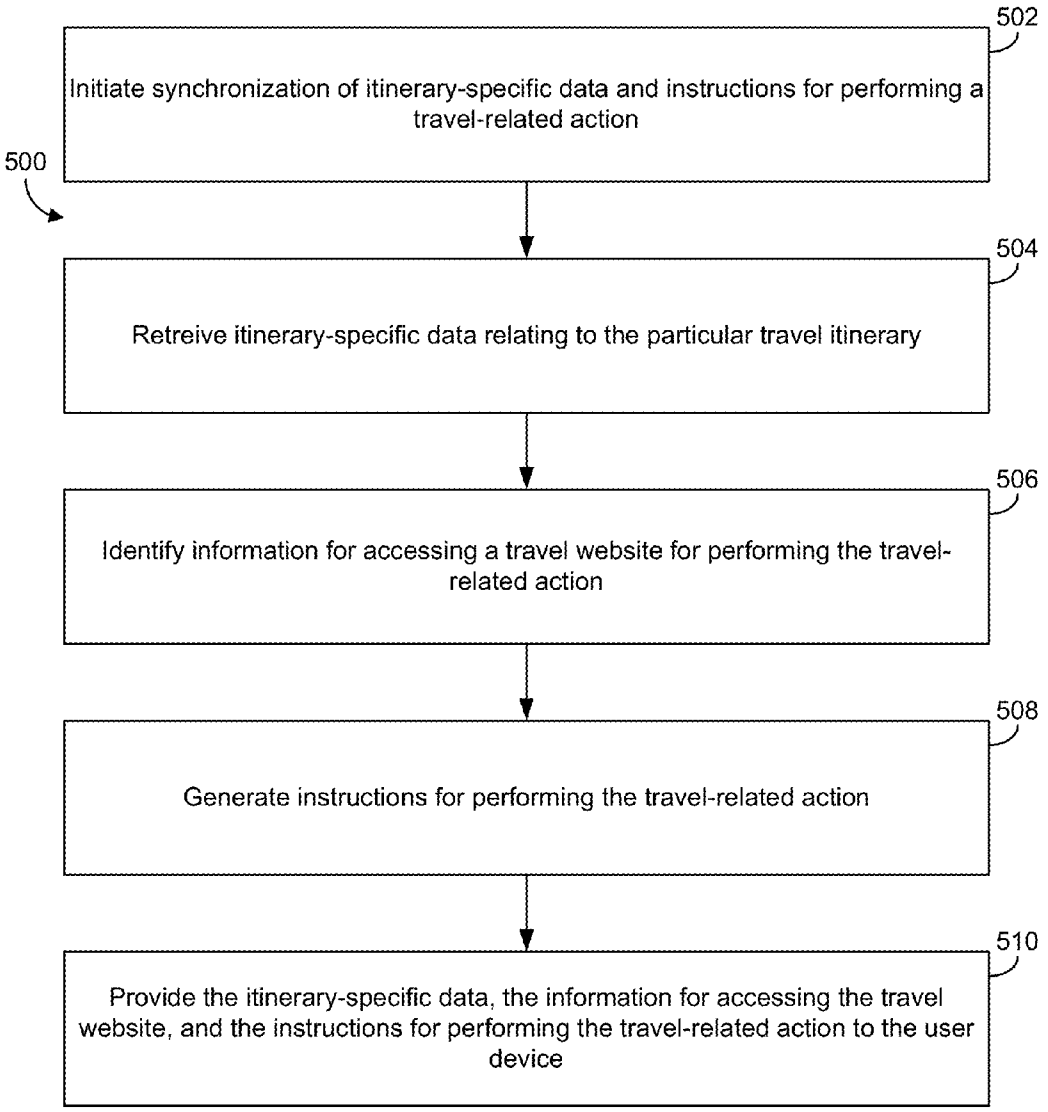

500
502
Initiate synchronization of itinerary-specific data and instructions for performing a travel-related action
504
Retreive itinerary-specific data relating to the particular travel itinerary
506
Identify information for accessing a travel website for performing the travel-related action
508
Generate instructions for performing the travel-related action
510
Provide the itinerary-specific data, the information for accessing the travel website, and the instructions for performing the travel-related action to the user device

FIG. 13

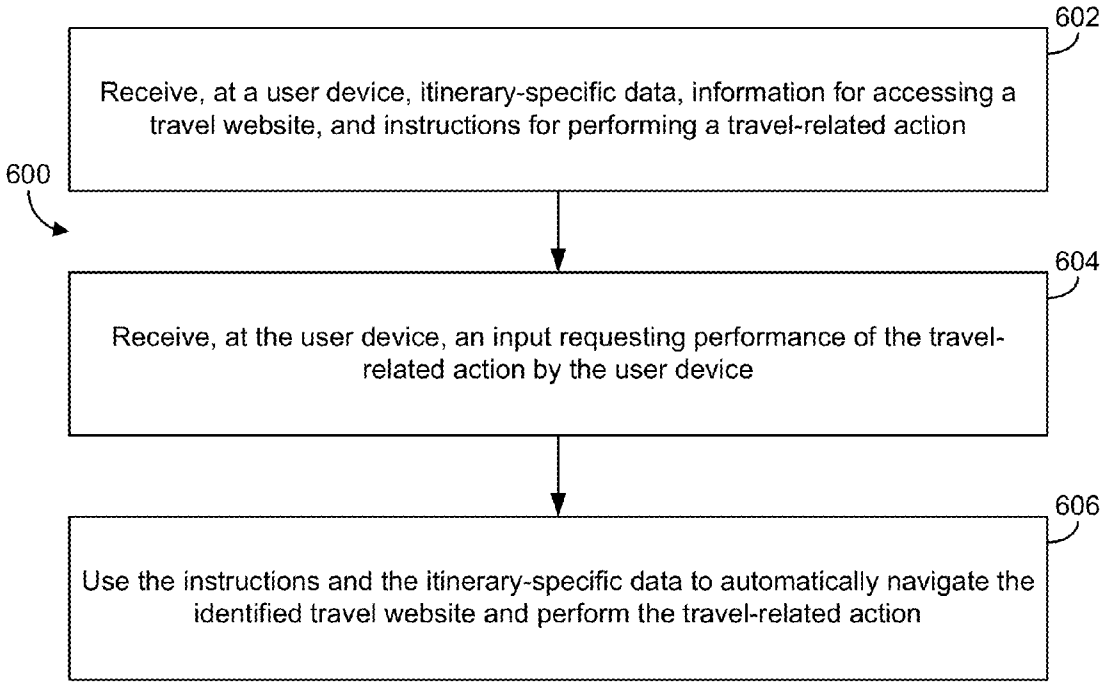

600
602
Receive, at a user device, itinerary-specific data, information for accessing a travel website, and instructions for performing a travel-related action
604
Receive, at the user device, an input requesting performance of the travel-related action by the user device
606
Use the instructions and the itinerary-specific data to automatically navigate the identified travel website and perform the travel-related action

FIG. 14

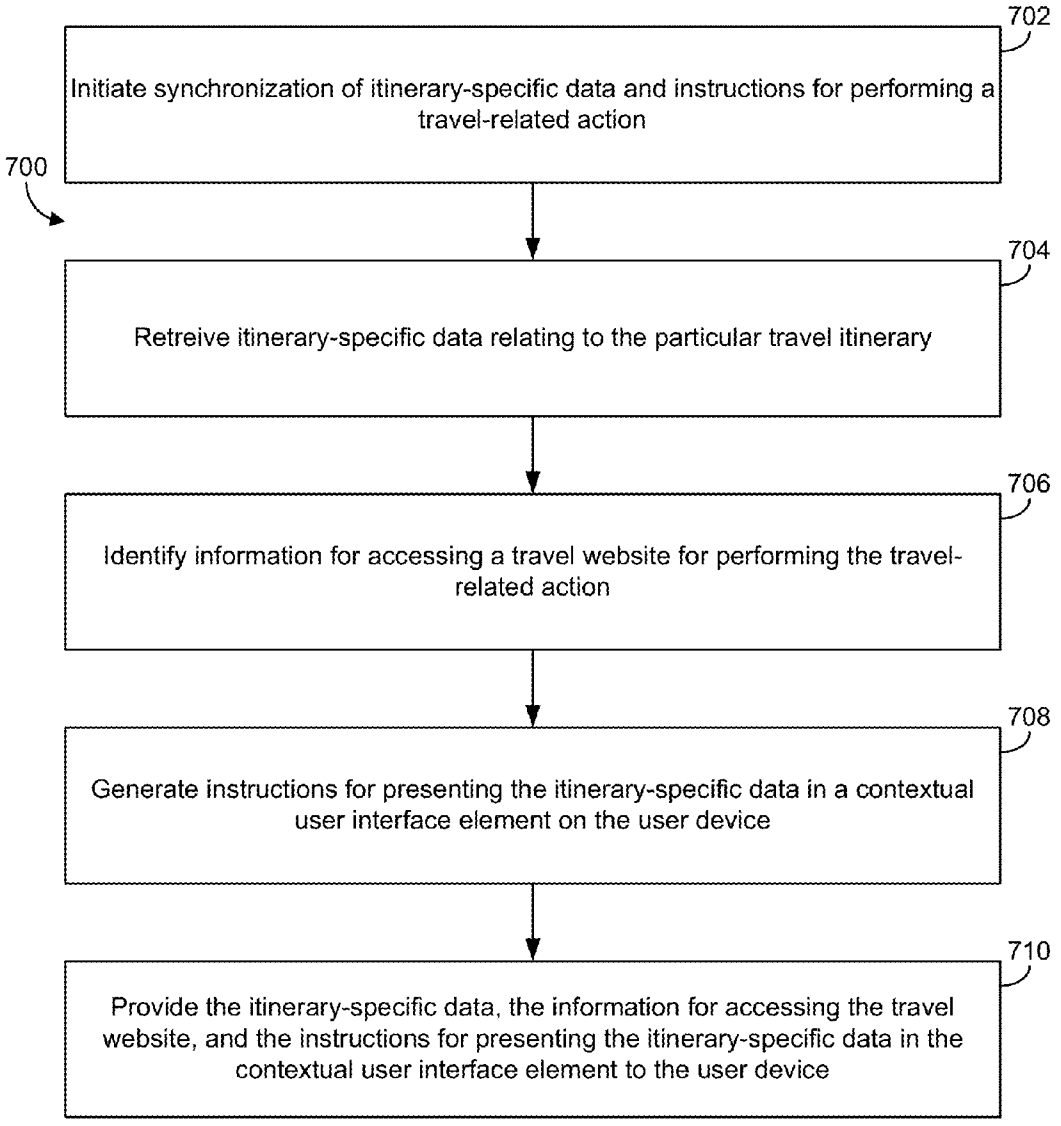

700
702
Initiate synchronization of itinerary-specific data and instructions for performing a travel-related action
704
Retreive itinerary-specific data relating to the particular travel itinerary
706
Identify information for accessing a travel website for performing the travel-related action
708
Generate instructions for presenting the itinerary-specific data in a contextual user interface element on the user device
710
Provide the itinerary-specific data, the information for accessing the travel website, and the instructions for presenting the itinerary-specific data in the contextual user interface element to the user device

FIG. 15

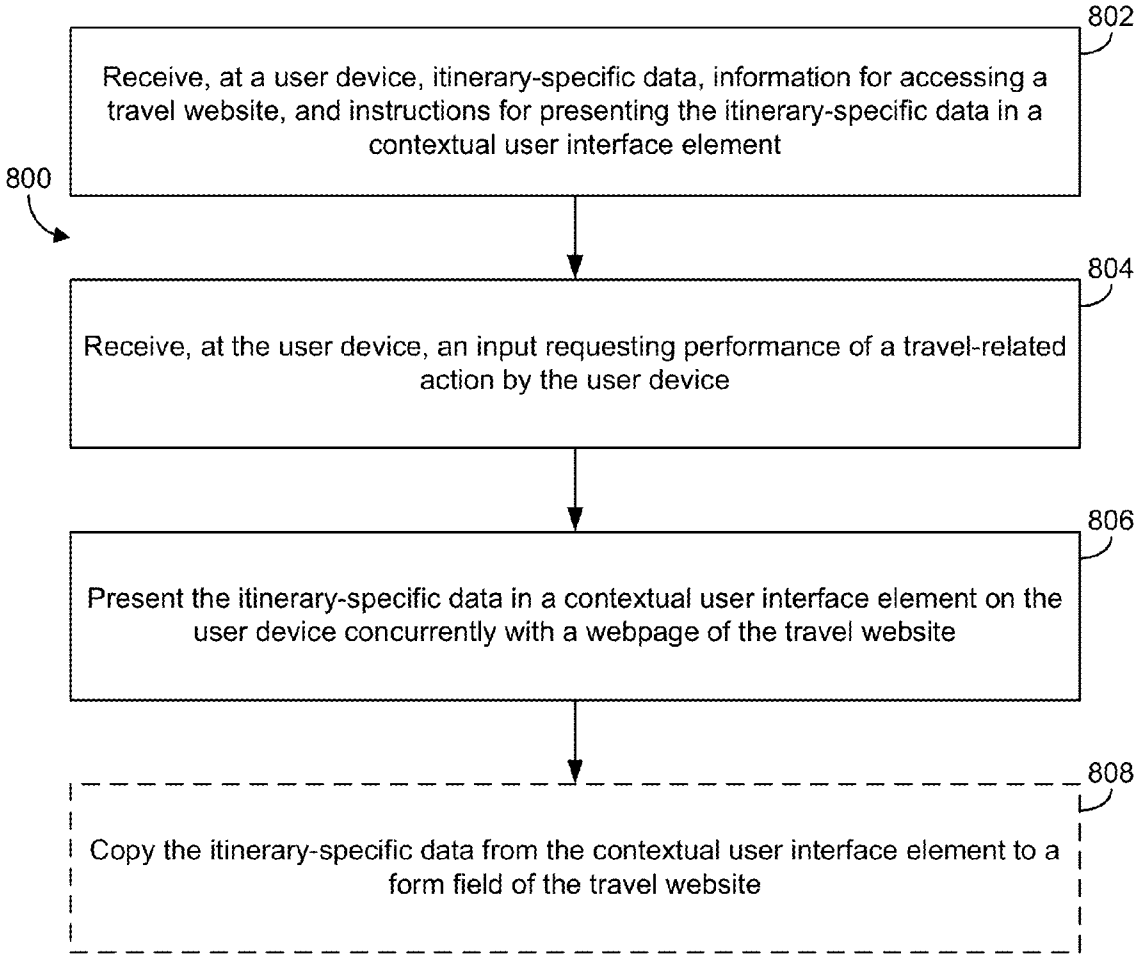

800
802
Receive, at a user device, itinerary-specific data, information for accessing a travel website, and instructions for presenting the itinerary-specific data in a contextual user interface element
804
Receive, at the user device, an input requesting performance of a travel-related action by the user device
806
Present the itinerary-specific data in a contextual user interface element on the user device concurrently with a webpage of the travel website
808
Copy the itinerary-specific data from the contextual user interface element to a form field of the travel website

FIG. 16

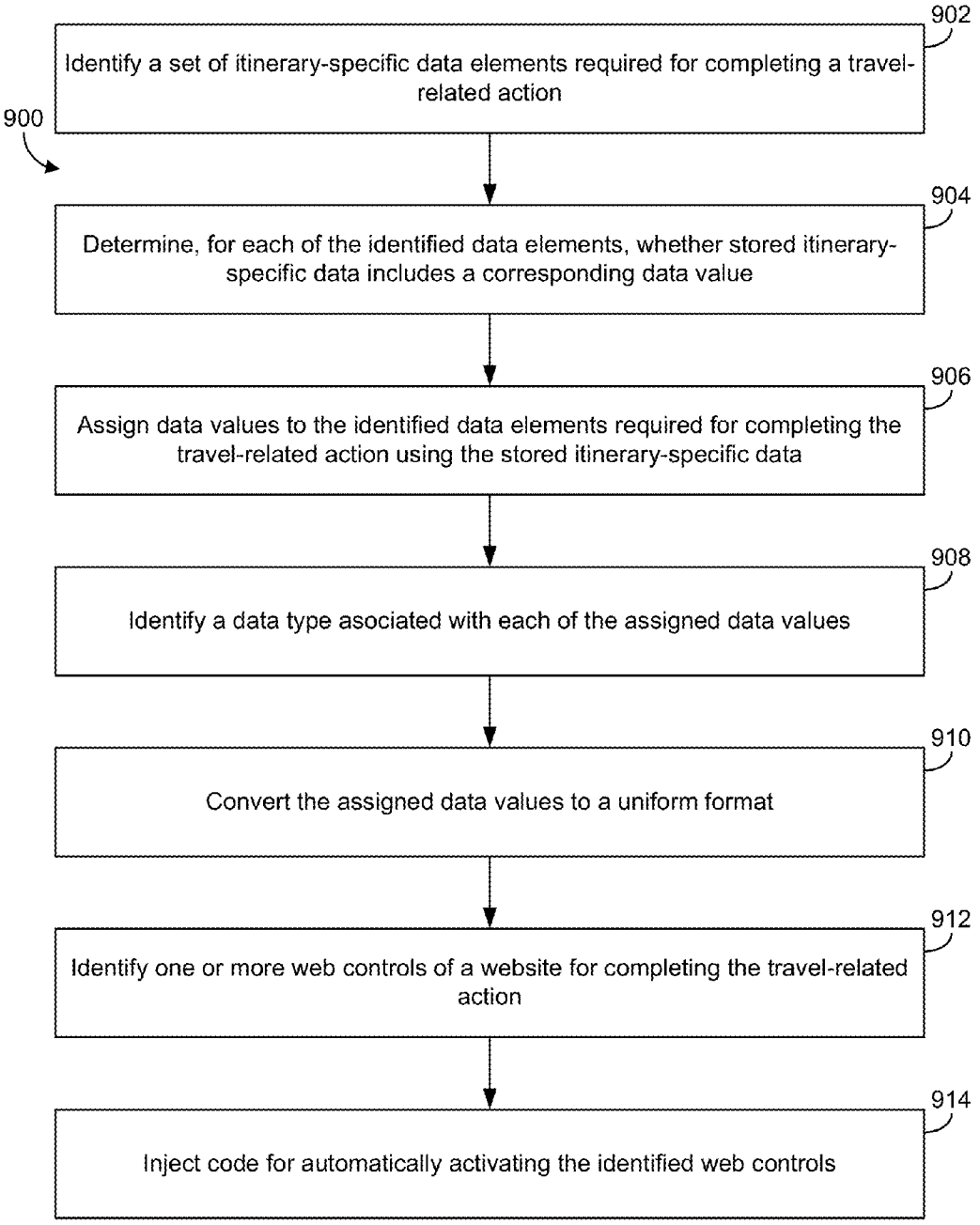

900
902
Identify a set of itinerary-specific data elements required for completing a travel-related action
904
Determine, for each of the identified data elements, whether stored itinerary-specific data includes a corresponding data value
906
Assign data values to the identified data elements required for completing the travel-related action using the stored itinerary-specific data
908
Identify a data type asociated with each of the assigned data values
910
Convert the assigned data values to a uniform format
912
Identify one or more web controls of a website for completing the travel-related action
914
Inject code for automatically activating the identified web controls

FIG. 17

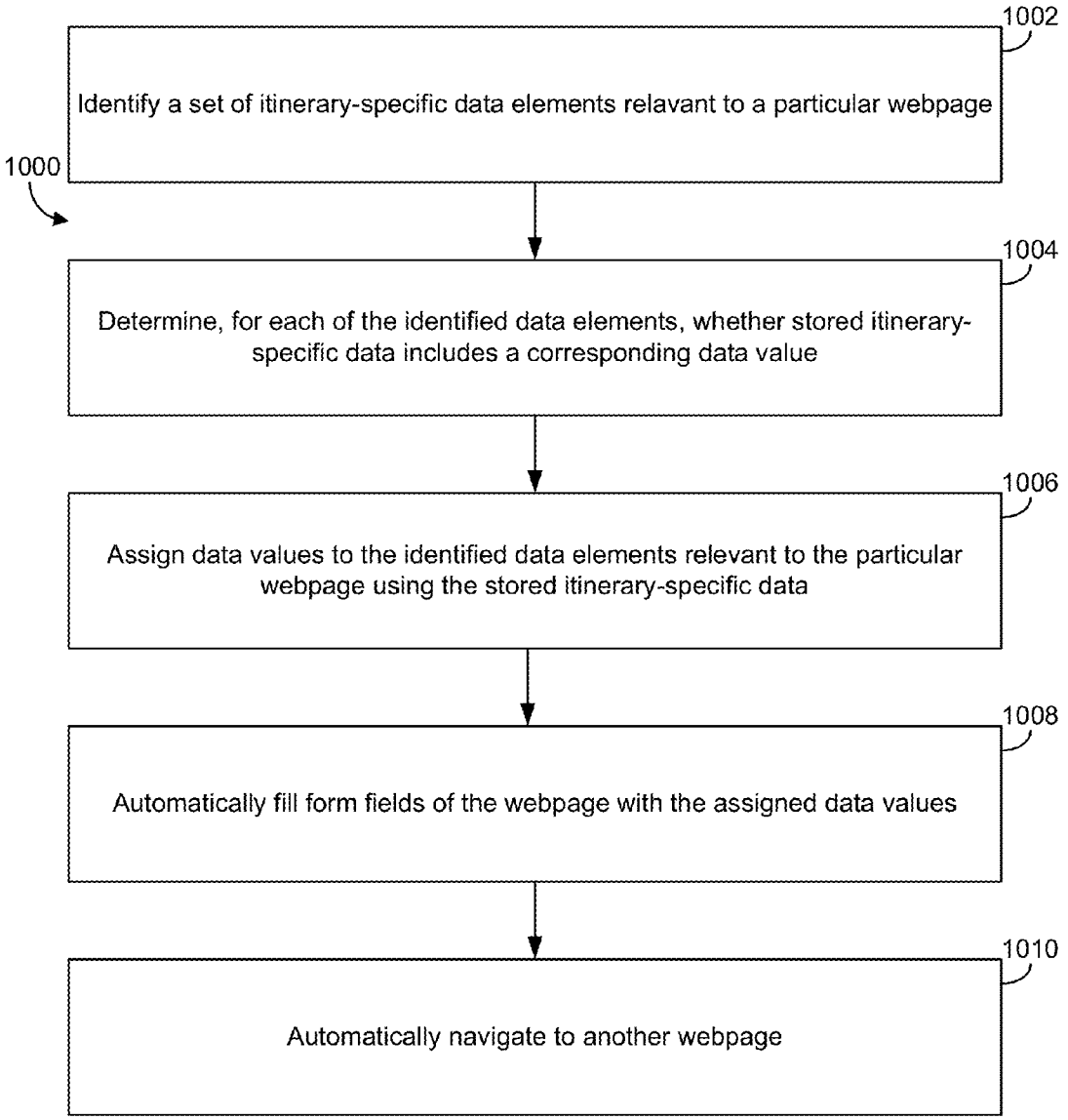

1000
1002
Identify a set of itinerary-specific data elements relavant to a particular webpage
1004
Determine, for each of the identified data elements, whether stored itinerary-specific data includes a corresponding data value
1006
Assign data values to the identified data elements relevant to the particular webpage using the stored itinerary-specific data
1008
Automatically fill form fields of the webpage with the assigned data values
1010
Automatically navigate to another webpage

FIG. 18

# SYSTEMS AND METHODS FOR PROVIDING A CONTEXTUAL USER INTERFACE ELEMENT

## BACKGROUND

**[0001]** The present description relates generally to systems and methods for managing travel arrangements on a mobile device. More specifically, the present description relates to systems and methods for automatically navigating a website operated by a travel provider and for facilitating interactions between such travel websites and a mobile device.

**[0002]** Many travel providers operate websites through which users can create and manage travel arrangements. For example, a user may visit websites operated by airlines, hotels, or car rental services to purchase airline tickets, check-in to a flight or hotel, cancel or change reservations, or perform other travel-related actions. Although many travel websites require the same or similar information from a user for performing such travel-related actions, the structure and user interface for various travel websites are often significantly different. It can be challenging and time consuming for a user to learn and navigate many different user interfaces presented by different travel websites.

**[0003]** Additionally, using a travel website to perform travel-related actions (e.g., checking into a flight or hotel) typically requires a user to manually enter information relating to a particular user and a particular travel arrangement. For example, a user may be required to login to a user account and enter a confirmation number before being able to confirm a reservation or check-in for a flight. It is challenging and difficult to automate such travel-related actions due to the differences between travel providers' websites and the user-specific and arrangement-specific information required.

## SUMMARY

**[0004]** One implementation of the present disclosure is a system for facilitating interactions between a travel website and a user device. The system includes a user device configured to receive, from a remote server, itinerary-specific data relating to a particular travel itinerary and information for accessing a travel website for performing a travel-related action. The user device is configured to present the itinerary-specific data in a contextual user interface element on the user device concurrently with a web page of the travel website for performing the travel-related action. The itinerary-specific data are presented as selectable data elements within the contextual user interface element. The user device is configured to receive a user selection of a selectable data element and to execute instructions for copying the itinerary-specific data from the contextual user interface element to a form field of the travel website in response to the user selection.

**[0005]** In some embodiments, the user device is configured to receive a user input requesting performance of a travel-related action by the user device and to send a request for instructions for performing the travel-related action to a remote server, the request including an indication of a particular travel itinerary.

**[0006]** In some embodiments, the user device is configured to receive instructions for presenting the itinerary-specific data in the contextual user interface element from the remote server. The itinerary-specific data may be presented in the contextual user interface element according to the instructions received from the remote server.

**[0007]** In some embodiments, the user device is a mobile device is configured to present the webpage of the travel website using a web browser embedded in an application running on the user device. The application may be configured to generate the contextual user interface element and present the contextual user interface element concurrently with the webpage of the travel website. In some embodiments, the application is a mobile application running on the mobile device.

**[0008]** In some embodiments, the user device is configured to determine which of a plurality of itinerary-specific data elements to present in the contextual user interface element based on content of the web page presented concurrently with the contextual user interface element.

**[0009]** In some embodiments, the user device is configured to load a first webpage of the travel website in a web browser running on the user device, present a subset of the itinerary-specific data in the contextual user interface element concurrently with the first webpage, navigate from the first webpage of the travel website to a second webpage of the travel website using the web browser, adjust the subset of itinerary-specific data elements presented in the contextual user interface element in response to navigating from the first webpage to the second webpage, and present the adjusted subset of itinerary-specific data elements in the contextual user interface element concurrently with the second webpage.

**[0010]** In some embodiments, the user device is further configured to select one or more of a plurality of itinerary-specific data elements for inclusion in the subset of itinerary-specific data presented concurrently with the first webpage based on content of the first webpage, and select one or more of the plurality of itinerary-specific data elements for inclusion in the adjusted subset of itinerary-specific data presented concurrently with the second webpage based on content of the second webpage.

**[0011]** In some embodiments, the system further includes a remote server configured to generate instructions for presenting the itinerary-specific data in the contextual user interface element and provide the instructions to the user device. The itinerary-specific data may be presented in the contextual user interface element by the user device according to the instructions received from the remote server.

**[0012]** In some embodiments, the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for determining which of a plurality of itinerary-specific data elements to present in the contextual user interface element. In some embodiments, the instructions are JavaScript® instructions.

**[0013]** Another implementation of the present disclosure is a method for facilitating interactions between a travel website and a user device. The method includes initiating, at a remote server, synchronization of itinerary-specific data and instructions for performing a travel-related action with a user device. The method further includes retrieving itinerary-specific data relating to the particular travel itinerary from an itinerary database and identifying, by the remote server, information for accessing a travel website for performing the travel-related action. The method further includes generating, by the remote server, instructions for presenting the itinerary-specific data in a contextual user interface element on the user device. The instructions may include instructions for presenting the contextual user interface element concurrently with a webpage of the travel website for performing the travel-related action. The method further includes providing the itin-

erary-specific data, the information for accessing the travel website, and the instructions for presenting the itinerary-specific data in the contextual user interface element to the user device.

**[0014]** In some embodiments, the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for copying the itinerary-specific data from the contextual user interface element to a form field of the travel website.

**[0015]** In some embodiments, the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for presenting the itinerary-specific data as selectable data elements in the contextual user interface element. The instructions for presenting the itinerary-specific data in the contextual user interface element may further include instructions for copying the itinerary-specific data from the contextual user interface element to a form field of the travel website in response to a user selection of a selectable data element.

**[0016]** In some embodiments, the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for determining which of a plurality of itinerary-specific data elements to present in the contextual user interface element.

**[0017]** In some embodiments, the instructions for determining which of the plurality of itinerary-specific data elements to present in the contextual user interface element include logic for determining which of the plurality of itinerary-specific data elements to present in the contextual user interface element based on content of the one or more concurrently-presented web pages of the travel website. In some embodiments, the instructions are JavaScript® instructions.

**[0018]** Another implementation of the present disclosure is a method for facilitating interactions between a travel website and a user device. The method includes receiving, at a user device, itinerary-specific data relating to a particular travel itinerary, information for accessing a travel website for performing the travel-related action, and instructions for presenting the itinerary-specific data in a contextual user interface element. The method further includes receiving, via a user interface element of the user device, an input requesting performance of a travel-related action by the user device. The method further includes presenting the itinerary-specific data in a contextual user interface element on the user device. The contextual user interface element may be presented concurrently with a webpage of the travel website for performing the travel-related action.

**[0019]** In some embodiments, the method further includes loading a webpage of the travel website for performing the travel-related action in a web browser running on the user device and copying the itinerary-specific data from the contextual user interface element to a form field of the travel website for performing the travel-related action.

**[0020]** In some embodiments, the itinerary-specific data are presented as selectable data elements within the contextual user interface element and the method further includes receiving a user selection of a selectable data element. The itinerary-specific data may be copied from the contextual user interface element to a form field of the travel website in response to the user selection.

**[0021]** In some embodiments, the itinerary-specific data are presented as movable icons within the contextual user interface element and the method further includes receiving a user input moving a movable icon into a space occupied by a form field of the travel website. The itinerary-specific data may be copied from the contextual user interface element to the form field of the travel website in response to the user input.

**[0022]** In some embodiments, the contextual user interface element is presented as a variable-transparency user interface element and the itinerary-specific data are presented as movable icons within the variable-transparency user interface element. The method may further include adjusting a transparency of the contextual user interface element in response to a user input moving a movable icon out of the contextual user interface element.

**[0023]** In some embodiments, the method further includes determining which of a plurality of itinerary-specific data elements to present in the contextual user interface element based on content of the webpage presented concurrently with the contextual user interface element.

**[0024]** In some embodiments, the method further includes loading a first webpage of the travel website for performing the travel-related action in a web browser running on the user device, presenting a subset of the itinerary-specific data in the contextual user interface element concurrently with the first webpage, navigating from the first webpage of the travel website to a second webpage of the travel website, adjusting the subset of itinerary-specific data elements presented in the contextual user interface element in response to navigating from the first webpage to the second webpage, and presenting the adjusted subset of itinerary-specific data elements in the contextual user interface element concurrently with the second webpage.

**[0025]** In some embodiments, the method further includes selecting one or more of a plurality of itinerary-specific data elements for inclusion in the subset of itinerary-specific data presented concurrently with the first webpage based on content of the first webpage and selecting one or more of the plurality of itinerary-specific data elements for inclusion in the adjusted subset of itinerary-specific data presented concurrently with the second webpage based on content of the second webpage.

**[0026]** Those skilled in the art will appreciate that the summary is illustrative only and is not intended to be in any way limiting. Other aspects, inventive features, and advantages of the devices and/or processes described herein, as defined solely by the claims, will become apparent in the detailed description set forth herein and taken in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0027]** FIG. **1** is a drawing illustrating, in brief overview, a system for facilitating interactions between a user device and a travel website, according to an exemplary embodiment.

**[0028]** FIG. **2** is a drawing of a contextual user interface element which may be presented by the user device and used to automatically fill form fields with itinerary-specific data without requiring a user to manually enter the data, according to an exemplary embodiment.

**[0029]** FIG. **3**A is a system architecture diagram illustrating, in greater detail, the system of FIG. **1** and showing a series process steps which may be performed by a remote server and a user device for facilitating interactions between the user device and a travel website, according to an exemplary embodiment.

**[0030]** FIG. **3**B is a system architecture diagram illustrating, in greater detail, the system of FIG. **1** and showing an

alternate series process steps which may be performed by a remote server and a user device for facilitating interactions between the user device and a travel website, according to an exemplary embodiment.

**[0031]** FIG. **4** is a block diagram illustrating, in greater detail, the remote server shown in FIGS. **3**A-**3**B, according to an exemplary embodiment.

**[0032]** FIG. **5** is a block diagram illustrating, in greater detail, the user device shown in FIGS. **3**A-**3**B, according to an exemplary embodiment.

**[0033]** FIG. **6** is a drawing of a user interface which may be presented via the user device, showing a selectable icon for initiating a process to automatically perform a travel-related action, according to an exemplary embodiment.

**[0034]** FIGS. **7-12** are drawings of another user interface which may be presented via the user device in response to a user selection of the selectable icon of FIG. **6**, the user interface illustrating, in greater detail, the contextual user interface element of FIG. **2**, according to an exemplary embodiment.

**[0035]** FIG. **13** is a flowchart of a process which may be performed by the remote server of FIG. **4** for facilitating interactions between a user device and a travel website, according to an exemplary embodiment.

**[0036]** FIG. **14** is a flowchart of a process which may be performed by the user device of FIG. **5** for facilitating interactions between the user device and a travel website, according to an exemplary embodiment.

**[0037]** FIG. **15** is a flowchart of a process which may be performed by the remote server of FIG. **4** for generating and causing presentation of the contextual user interface element shown in FIGS. **7-12**, according to an exemplary embodiment.

**[0038]** FIG. **16** is a flowchart of a process which may be performed by the user device of FIG. **5** for presenting the contextual user interface element shown in FIGS. **7-12**, according to an exemplary embodiment.

**[0039]** FIG. **17** is a flowchart of a process for identifying and assigning data values for a set of itinerary-specific data elements required for completing a travel-related action, according to an exemplary embodiment.

**[0040]** FIG. **18** is a flowchart of a process for automatically filling form fields of a travel website with itinerary-specific data and automatically navigating through a travel website to complete a travel-related action, according to an exemplary embodiment.

## DETAILED DESCRIPTION

**[0041]** Referring generally to the FIGURES, systems and methods for facilitating interactions between a travel website and a user device are shown, according to several exemplary embodiments. The systems and methods described herein may be used to automate or partially automate various travel-related actions which can be performed through a travel website (e.g., a website operated by a travel provider such as an airline, a hotel, a car rental service, etc.). For example, the described systems and methods can be used to facilitate online check-in for a flight or a hotel, to confirm or change existing travel arrangements, to create new travel arrangements, and/or to perform other travel-related actions which can be accomplished through a travel website.

**[0042]** Although many travel websites require the same or similar types of information from a user for performing travel-related actions (e.g., user name, confirmation number, phone number, etc.), the particular information may be different for different websites. For example, a username and password for logging in to the American Airlines website may be different than a username and password for logging in to the United Airlines website for the same user. Additionally, the steps required to navigate the American Airlines website and the United Airlines website may be significantly different. It can be challenging and time consuming for a user to learn and navigate many different travel websites. Also, it can be difficult for a user to remember or retrieve itinerary-specific information (e.g., reservation number, confirmation number, flight departure time, etc.) relating to particular travel arrangements.

**[0043]** Advantageously, the systems and methods described herein may provide a user-friendly interface for interacting with many different travel websites via a single user application. The described systems and methods may facilitate automatic navigation through many different travel websites to direct a user to the exact webpage required to perform the desired travel-related action. Additionally, the described systems and methods can automatically provide itinerary-specific data to the travel website (e.g., by automatically filling form fields presented on the travel website, by presenting a user interface element containing itinerary-specific data, etc.), thereby eliminating the requirement for a user to remember or retrieve such information (e.g., from a confirmation email, etc.). Thus, the systems and methods of the present application may advantageously allow a user to quickly open an application and check-in to a flight without searching through emails for the information needed to manually login to the travel provider's website or complete the check-in process.

**[0044]** Referring now to FIG. **1**, a drawing of a system **100** for facilitating interactions between a travel website and a user device is shown, according to an exemplary embodiment. System **100** illustrates, in brief overview, several features and advantages provided by the systems and methods of the present disclosure. System **100** is shown to include a user device **102**, a remote server **104**, and a travel provider **106**. In some embodiments, user device **102** is a mobile computing device such as a smartphone, a laptop computer, a tablet computer, or other portable computing device. User device **102** is configured to run a mobile application. The mobile application is configured to interact with remote server **104** and travel provider **106** for performing various travel-related actions. In some embodiments, the mobile application includes an embedded web browser for rendering and/or presenting travel website data from travel provider **106**.

**[0045]** Remote server **104** manages and stores itinerary-specific data and site-specific navigation information. Itinerary-specific data includes information relating to a particular user and/or a particular travel arrangement (e.g., flight number, reservation number, departure time, departure location, passenger name, etc.). Site-specific navigation information includes information describing a sequence of actions or web pages required to perform a particular travel-related action for a particular travel website.

**[0046]** Travel provider **106** may be a provider of any travel-related service. For example, travel provider **106** may be an airline, a railroad, a water travel provider, a bussing provider, a hotel organization, a car rental service, or any other travel-related service provider. In alternate embodiments, travel provider **106** may be a travel agency or another travel-related service provider. Travel provider **106** may operate a website through which users can perform travel-related actions. For

example, travel-related actions may include checking-in for a flight or a hotel, confirming or changing existing travel arrangements, canceling travel arrangements, creating new travel arrangements, or other types of interactions between a user and a travel provider **106**.

**[0047]** The website operated by travel provider **106** may include a series of individual web pages. For example, a particular travel website may require a user to login at a first webpage, enter a confirmation number at a second webpage, and finally click a confirmation button at a third web page. Ordinarily, a user would be required to manually navigate the series of web page and manually enter information into each of the individual web pages.

**[0048]** Still referring to FIG. **1**, user device **102** is shown receiving itinerary-specific data and site-specific navigation logic from remote server **104**. In some embodiments, the itinerary-specific data and/or the site-specific navigation logic may be received from remote server **104** as executable instructions. User device **102** is also shown receiving a series of web pages (e.g., travel website data) from travel provider **106**. Advantageously, user device **102** can combine the series of web pages with the site-specific navigation logic and itinerary-specific data to create a modified version of the travel website which can be automatically navigated and automatically populated by user device **102**.

**[0049]** User device **102** can automatically navigate the series of web pages received from travel provider **106** (e.g., according to the site-specific navigation logic) and automatically enter any required information to the series of web pages (e.g., according to the itinerary-specific data) to automatically complete the travel-related action. For example, user device **102** is shown displaying a web page having a "Last Name" form field **108**, a "Reservation #" form field **110**, and a "Next Page" button **111**. The executable instructions may cause user device **102** to populate form fields **108-110** with the itinerary-specific data received from remote server **104** and automatically select "Next Page" button **111** when all of the required information has been entered.

**[0050]** User device **102** may be configured to present a contextual user interface element **112** for displaying one or more of the itinerary-specific data received from remote server **104**. Contextual user interface element **112** may be configured to present the itinerary-specific data as selectable data elements and/or movable icons. A user can drag an icon out of contextual user interface element **112** and drop the icon into a form field of the travel website to insert/copy the value of the data element associated with the icon into the form field. Alternatively, a user can click in a form field and then click an icon to apply the value of the data element associated with the icon into the form field. This semi-automated form-filling (e.g., by dragging and dropping or clicking) may advantageously eliminate the need for users to manually enter the itinerary-specific information into the travel website.

**[0051]** Contextual user interface element **112** may be presented concurrently with one or more of the series of web pages received from travel provider **106**. In some embodiments, contextual user interface element **112** may be configured to display icons or data elements relevant to a particular web page. For example, the application running on user device **102** may be configured to determine which of a plurality of itinerary specific data elements to include within contextual user interface element **112** based on the content of the webpage with which contextual user interface element **112** is concurrently displayed. This feature may allow contextual user interface element **112** to be adjusted (e.g., by adding or removing data elements) as user device **102** navigates through the series of web pages to ensure that a user is provided with the information needed to complete any required form fields of the travel website.

**[0052]** Advantageously, user device **102** may run a single application configured to access, automatically navigate, and automatically provide itinerary-specific data to many different travel websites. The application may be a third-party application configured to access a standard mobile or non-mobile version of the travel providers' websites using a web browser embedded within the application. The application may not be affiliated with any particular travel provider and may be capable of interacting with the websites of many different travel providers.

**[0053]** Referring now to FIG. **2**, user device **102** may be configured to present a contextual user interface element **112**. Contextual user interface element **112** may include one or more of the itinerary-specific data received from remote server **104**. For example, referring specifically to FIG. **2**A, contextual user interface element **112** is shown displaying a "Last Name" data element **114** and a "Reservation #" data element **116**. In some embodiments, data elements displayed in contextual user interface element **112** include an indication of the type of data element (e.g., data element name, description, title, etc.) and a value of the data element. For example, the value of "Last Name" data element **114** is shown as "Andreas Evens" and the value of the "Reservation #" data element **116** is shown as "34516464761."

**[0054]** In some embodiments, one or more of form fields **108-110** may be automatically populated with data element values according to the executable instructions received from remote server **104**. For example, "Last Name" form field **108** is shown pre-populated with the value of "Last Name" data element **114**. However, in some instances, not all form fields can be populated automatically. For example, some travel websites may be unsupported or may have recently changed in a way that temporarily prevents automatic population (e.g., changed form field names, updated website design, etc.). Contextual user interface element **112** can be used to display itinerary-specific data in a format that can be easily applied to form fields in the travel website when automatic population is unavailable.

**[0055]** Referring specifically to FIGS. **2**B-**2**C, data elements in contextual user interface element **112** may be dragged into form fields in the travel web site to automatically apply the value of the data elements to the form field. For example, "Reservation #" data element **116** can be dragged into form field **110** (shown in FIG. **2**B) to apply the value of data element **116** (e.g., "34516464761") to form field **110** (shown in FIG. **2**C). Data element values may also be applied to form fields by clicking in the form field and clicking on the data element in contextual user interface element **112**. Advantageously, contextual user interface element **112** facilitates semi-automatic form field population (e.g., by dragging and dropping, clicking, etc.) without requiring a user to manually enter the data value.

**[0056]** Referring specifically to FIGS. **2**C-**2**D, in some embodiments, contextual user interface element **112** may be configured to display data elements relevant to a particular web page. User device **102** may determine which data elements are relevant to a particular web page based on the content of the web page data (e.g., HTML data, XML data, form field names, etc.). User device **102** may add, remove,

re-organize, or otherwise adjust the data elements presented in contextual user interface element **112** based on the context provided by the web page data.

**[0057]** As user device **102** navigates from page to page (e.g., automatically or in response to a user input), the data elements displayed in contextual user interface element **112** may be adjusted. For example, as user device **102** navigates from the web page shown in FIG. **2**C to the web page shown in FIG. **2**D, data elements **114-116** may be replaced with data elements **118-122**. Data elements **118-122** may be selected for display in contextual user interface element **112** based on the content of the web page shown in FIG. **2**D. For example, FIG. **2**D shows a web page having form fields labeled "Passport," "Emergency Contact," and "Phone." User device **102** may identify itinerary-specific data elements corresponding to the form fields in the web page and present the identified data elements in contextual user interface element **112**. A user may apply the values of data elements **118-122** to the form fields by dragging and dropping or clicking, as previously described.

**[0058]** Referring now to FIG. **3**A, a system architecture diagram **130** illustrating the components of system **100** in greater detail is shown, according to an exemplary embodiment. System architecture diagram **130** is shown to include user device **102**, remote server **104**, and travel provider **106**.

**[0059]** User device **102** may be any type of user-operable electronic device. For example, user device **102** may be a desktop computer, laptop computer, smartphone, tablet computer, mobile communication device, remote workstation, client terminal, entertainment console, or any other device capable of interacting with the other components of system **100** (e.g., via a communications interface). In some embodiments, user device **102** is a mobile computing device (e.g., a laptop computer, a smartphone, etc.). In other embodiments, user device **102** is a non-mobile device (e.g., a desktop computer, a stationary client terminal, etc.).

**[0060]** User device **102** may be configured to run an application for interacting with remote server **104** and travel provider **106**. In some embodiments, the application may be a mobile application (e.g., an application designed to be run by a mobile computing device). The application may be used to automate and/or facilitate performance of various travel-related actions. In some embodiments, the application includes an embedded web browser for rendering or presenting website data from travel provider **106**.

**[0061]** Still referring to FIG. **3**A, remote server **104** may manage itinerary-specific data relating to particular travel arrangements. For example, when a user purchases a flight ticket, information relating to the travel arrangement (e.g., flight number, reservation number, departure time, departure location, passenger name, etc.) may be provided to remote server **104**. Remote server **104** may interact with travel provider **106** to retrieve detailed information relating to various travel arrangements and update the stored itinerary-specific data if any of the details change. The itinerary-specific data may include data relating to both a particular user and a particular travel arrangement. In some embodiments, the itinerary-specific data includes all the raw information necessary to perform a travel-related action.

**[0062]** Remote server **104** may also store site-specific navigation information for various travel websites. The site-specific navigation information may include information describing a sequence of actions required to perform a travel-related action for a particular travel website. For example, a particular travel website may require a user to login at a first webpage, enter a confirmation number at a second webpage, and finally click a confirmation icon at a third web page. The site-specific navigation information may provide navigation logic for performing a particular travel-related action at a particular travel website.

**[0063]** Still referring to FIG. **3**A, travel provider **106** may be a provider of any travel-related service. For example, travel provider **106** may be an airline, a railroad, a water travel provider, a bussing provider, a hotel organization, a car rental service, or any other travel-related service provider. In alternate embodiments, travel provider **106** may be a travel agency or another travel-related service provider. Travel provider **106** may operate a website through which users can perform travel-related actions (i.e., a "travel website"). For example, travel-related actions may include checking-in for a flight or a hotel, confirming or changing existing travel arrangements, canceling travel arrangements, creating new travel arrangements, or other types of interactions between a user and a travel provider **106**. In some embodiments, the travel website includes a series of individual web pages and may include one or more web forms requiring input from user device **102** for completing the travel-related action.

**[0064]** Still referring to FIG. **3**A, system architecture diagram **130** is shown to include a series of interactions between user device **102**, remote server **104**, and travel provider **106**. The series of interactions illustrates an exemplary process for facilitating performance of travel-related actions by user device **102**.

**[0065]** The illustrated process is shown to include synchronizing itinerary-specific data and instructions (step **1***a*). In step **1***a*, user device **102** receives the most recent itinerary-specific data from remote server **104**. In some embodiments, step **1***a* is performed each time itinerary-specific data is updated at remote server **104**. The itinerary-specific data may include data relating to a particular travel itinerary or travel arrangement. For example, the itinerary-specific data may include a flight number, a reservation number, a confirmation number, a flight departure time, departure location, or any other information relating to a particular travel arrangement/itinerary.

**[0066]** In some embodiments, the itinerary-specific data includes data relating to both a particular user and a particular travel arrangement. Data relating to a particular user may include general user information which may be potentially relevant for more than one travel itinerary. For example, user-specific data may include the user's name, login information (e.g., for a particular travel website), passport information, phone number, emergency contact information, home address, or other information potentially relevant to a plurality of travel arrangements. In some embodiments, the itinerary-specific data includes all the raw information necessary to perform a travel-related action.

**[0067]** In step **1***a*, user device **102** also receives instructions for completing the travel-related action from remote server **104**. The instructions for performing the travel-related action may include a URL of a travel webpage. The URL may be a URL of a particular webpage of a travel website for initiating the travel-related action.

**[0068]** The instructions for completing the travel-related action may further include instructions for navigating the travel website. The instructions for navigating the travel website may be site-specific instructions (e.g., specific to a particular travel website) and/or action-specific instructions

(e.g., specific to a particular travel-related action). The instructions for navigating the travel website may include instructions for navigating from the provided URL of the travel webpage to the completion of the travel-related action. The instructions for navigating the travel website may include a series of web pages required to be loaded and/or a series of actions required to be performed by user device **102** to complete the travel-related action.

**[0069]** The instructions for completing the travel-related action may further include instructions for instructions for automatically providing the itinerary-specific data to the travel website. In some embodiments, the instructions for providing the itinerary-specific data to the travel website include instructions for automatically populating form fields of the travel website with the itinerary-specific information.

**[0070]** In some embodiments, the instructions for completing the travel-related action further include instructions for automatically providing user-specific data to the travel website or otherwise configuring the website for a particular user. The instructions for automatically providing user-specific data to the travel website may include instructions for providing login information to the website. Instructions for configuring the website for a particular user may include instructions for setting language, locale, or other user preferences when the website is displayed. In some embodiments, the instructions for providing user-specific data to the travel website or otherwise configuring the website for a particular user may be included in the itinerary-specific instructions and/or the navigation instructions.

**[0071]** In some embodiments, the instructions for completing the travel-related action further include instructions for providing a contextual user interface element (e.g., contextual user interface element **112**). The instructions for providing a contextual user interface element may include instructions for presenting particular itinerary-specific or user-specific data elements within contextual user interface element **112** when a particular webpage is loaded by user device **102**. In some embodiments, the instructions for providing the contextual user interface element may include logic for determining whether a particular data element should be displayed. The instructions for providing the contextual user interface element may further include instructions for inserting a value of a data element into a form field in response to a user input received via user device **102** (e.g., dragging and dropping the data element into a space occupied by the form field, clicking the data element into the form field, etc.).

**[0072]** Still referring to FIG. **3**A, the illustrated process is shown to further include receiving travel website data (step **2***a*). Step **2***a* may be performed by user device **102** by retrieving website data from travel provider **106**. In some embodiments, step **2***a* may be performed by user device **102** in response to a user input received at user device **102** (e.g., a user input requesting performance of a travel-related action). In other embodiments, step **2***a* may be performed by user device **102** in response to receiving itinerary-specific data, instructions, a push notification, or any other input from remote server **104**. The travel website data may include a series of web pages and one or more form fields requiring input from user device **102**.

**[0073]** Still referring to FIG. **3**A, the illustrated process is shown to include loading the travel website data (step **3***a*). Step **3***a* may be performed by user device **102** upon receiving the travel website data from travel provider **106**. In some embodiments, step **3***a* is performed by a web browser embedded in the application running on user device **102**. Loading the travel website data may include loading unmodified website data (e.g., a standard mobile or non-mobile version of the travel website).

**[0074]** The illustrated process is shown to further include injecting the instructions into the website data and executing the instructions (step **4***a*). Step **4***a* may be performed by user device **102** upon receiving both the travel website data from travel provider **106** and the instructions from remote server **104**. In some embodiments, step **4***a* may be performed by an application (e.g., a mobile application) running on user device **102**. In some embodiments, the instructions may be JavaScript® instructions and may be inserted into the existing website data as executable instructions. Injecting the instructions into the website data may create modified website data.

**[0075]** Executing the instructions may include performing actions according to the instructions. For example, executing the instructions may include automatically populating form fields in the travel website data with the itinerary-specific and/or user-specific data. In some embodiments, executing the instructions includes automatically navigating between pages of the travel website. In some embodiments, executing the instructions includes both automatically populating form fields and automatically navigating between pages of the travel website. For example, executing the instructions may cause user device **102** to navigate to a particular webpage, populate form fields of the webpage, and proceed to navigate to another webpage. By executing the instructions, user device **102** may automatically perform some or all of the operations required to complete the travel-related action.

**[0076]** Still referring to FIG. **3**A, the illustrated process is shown to include presenting a contextual user interface element (step **5***a*). Step **5***a* may be performed by user device **102** in addition to or in place of step **4***a*. The contextual user interface element (e.g., element **112**) may be an electronic "wallet" including one or more itinerary-specific or user-specific data elements which may be applied to form fields in the travel website data. In some embodiments, user device **102** selects particular data elements to include in contextual user interface element **112** based on the content of the webpage displayed (e.g., HTML content, XML content, metadata content, etc.). In other embodiments, user device **102** selects data elements to include in the contextual user interface element using the instructions for providing the contextual user interface element (e.g., received in step **1***a*).

**[0077]** The illustrated process is shown to further include executing additional instructions to insert data from the contextual user interface element (step **6***a*). Step **6***a* may be performed in response to a user input received via a user interface element of user device **102**. For example, as described with reference to FIG. **2**, a user may drag and drop data elements from the contextual user interface element into form fields of the travel website. Dropping a data element into a space occupied by a form field may cause user device **102** to execute additional instructions for automatically inserting the value of the data element into the form field.

**[0078]** Still referring to FIG. **3**A, the illustrated process is shown to further include providing the completed web forms to travel provider **106** (step **7***a*). Step **7***a* may be performed subsequent to completion of steps **1***a*-**6***a* or may be performed incrementally as user device **102** navigates through multiple web pages. In some embodiments, providing the completed web forms to travel provider **106** signifies completion of the

travel-related action. In some embodiments, step **7***a* may be performed automatically by user device **102** upon executing the instructions (e.g., in step **4***a*).

**[0079]** Referring now to FIG. **3**B, an alternate embodiment of the series of interactions between user device **102**, remote server **104**, and travel provider **106** is shown. The series of interactions illustrates another exemplary process for facilitating performance of travel-related actions by user device **102**. The process illustrated in FIG. **3**B may be used in place of or in addition to the process illustrated in FIG. **3**A.

**[0080]** The illustrated process is shown to include synchronizing itinerary-specific data (step **1***b*). In step **1***b*, user device **102** may retrieve the most recent itinerary-specific data from remote server **104**. The itinerary-specific data may include data relating to a particular travel itinerary or travel arrangement. For example, the itinerary-specific data may include a flight number, a reservation number, a confirmation number, a flight departure time, departure location, or any other information relating to a particular travel arrangement/itinerary.

**[0081]** In some embodiments, the itinerary-specific data includes data relating to both a particular user and a particular travel arrangement. Data relating to a particular user may include general user information which may be potentially relevant for more than one travel itinerary. For example, user-specific data may include the user's name, login information (e.g., for a particular travel website), passport information, phone number, emergency contact information, home address, or other information potentially relevant to a plurality of travel arrangements. In some embodiments, the itinerary-specific data includes all the raw information necessary to perform a travel-related action.

**[0082]** Still referring to FIG. **3**B, the illustrated process is shown to include requesting instructions for performing a travel-related action (step **2***b*). The request for instructions may be sent from user device **102** to remote server **104** in response to a user input received at user device **102** requesting performance of a particular travel-related action. For example, user device **102** may submit a request for instructions to remote server **104** in response to a user selecting an icon presented via user device **102** for initiating an online check-in process. The request for instructions may include an indication of a particular travel itinerary.

**[0083]** The illustrated process is shown to further include preparing instructions for performing the travel-related action (step **3***b*) and providing the prepared instructions to the user device (step **4***b*). Steps **3***b*-**4***b* may be performed by remote server **104** in response to a request for instructions received from user device **102**. The instructions for performing the travel-related action may include a URL of a travel webpage. The URL may be a URL of a particular webpage of a travel website for initiating the travel-related action.

**[0084]** The instructions may further include instructions for navigating the travel website. The instructions for navigating the travel website may be site-specific instructions (e.g., specific to a particular travel website) and/or action-specific instructions (e.g., specific to a particular travel-related action). The instructions for navigating the travel website may include instructions for navigating from the provided URL of the travel webpage to the completion of the travel-related action. The instructions for navigating the travel website may include a series of web pages required to be loaded and/or a series of actions required to be performed by user device **102** to complete the travel-related action.

**[0085]** The instructions may further include instructions for instructions for automatically providing the itinerary-specific data to the travel website. In some embodiments, the instructions for providing the itinerary-specific data to the travel website include instructions for automatically populating form fields of the travel website with the itinerary-specific information. In other embodiments, the instructions for providing the itinerary-specific data to the travel website include instructions for generating contextual user interface element **112**. The instructions for providing the itinerary-specific data to the travel website may include instructions for providing previously-received itinerary-specific data (e.g., data received in step **1***b*) or instructions for providing new/updated itinerary-specific data (e.g., included in the instructions, received from other sources, etc.).

**[0086]** In some embodiments, the instructions further include instructions for automatically providing user-specific data to the travel website or otherwise configuring the website for a particular user. The instructions for automatically providing user-specific data to the travel website may include instructions for providing login information to the website. Instructions for configuring the website for a particular user may include instructions for setting language, locale, or other user preferences when the website is displayed. In some embodiments, the instructions for providing user-specific data to the travel website or otherwise configuring the website for a particular user may be included in the itinerary-specific instructions and/or the navigation instructions.

**[0087]** In some embodiments, the instructions further include instructions for providing a contextual user interface element (e.g., contextual user interface element **112**). The instructions for providing a contextual user interface element may include instructions for presenting particular itinerary-specific or user-specific data elements within contextual user interface element **112** when a particular webpage is loaded by user device **102**. In some embodiments, the instructions for providing the contextual user interface element may include logic for determining whether a particular data element should be displayed. The instructions for providing the contextual user interface element may further include instructions for inserting a value of a data element into a form field in response to a user input received via user device **102** (e.g., dragging and dropping the data element into a space occupied by the form field, clicking the data element into the form field, etc.).

**[0088]** Still referring to FIG. **3**B, the illustrated process is shown to further include receiving travel website data (step **5***b*). Step **5***b* may be performed by user device **102** by retrieving website data from travel provider **106**. In some embodiments, step **5***b* may be performed by user device **102** in response to a user input received at user device **102**. In other embodiments, step **5***b* may be performed by user device **102** in response to receiving instructions from remote server **104**. The travel website data may include a series of web pages and one or more form fields requiring input from user device **102**.

**[0089]** The illustrated process is shown to further include injecting the instructions into the website data (step **6***b*). Step **6***b* may be performed by user device **102** upon receiving both the travel website data from travel provider **106** and the instructions from remote server **104**. In some embodiments, step **6***b* may be performed by an application (e.g., a mobile application) running on user device **102**. In some embodiments, the instructions may be JavaScript® instructions and may be inserted into the existing website data as executable

instructions. Injecting the instructions into the website data may create modified website data.

**[0090]** Still referring to FIG. **3**B, the illustrated process is shown to include loading the travel website data and executing the instructions (step **7***b*). Step **7***b* may be performed by user device **102** upon receiving both the travel website data from travel provider **106** and the instructions from remote server **104**. In some embodiments, step **7***b* may be performed by a web browser embedded in the application running on user device **102**. Loading the travel website data may include loading the unmodified website data (e.g., the data received in step **5***b*) or loading the modified website data (e.g., the data created in step **6***b*).

**[0091]** Executing the instructions may include performing actions according to the instructions. For example, executing the instructions may include automatically populating form fields in the travel website data with the itinerary-specific and/or user-specific data. In some embodiments, executing the instructions includes automatically navigating between pages of the travel website. In some embodiments, executing the instructions includes both automatically populating form fields and automatically navigating between pages of the travel website. For example, executing the instructions may cause user device **102** to navigate to a particular webpage, populate form fields of the webpage, and proceed to navigate to another webpage. By executing the instructions, user device **102** may automatically perform some or all of the operations required to complete the travel-related action.

**[0092]** Still referring to FIG. **3**B, the illustrated process is shown to include presenting a contextual user interface element (step **8***b*). Step **8***b* may be performed by user device **102** in addition to or in place of step **7***b*. The contextual user interface element (e.g., element **112**) may be an electronic "wallet" including one or more itinerary-specific or user-specific data elements which may be applied to form fields in the travel website data. In some embodiments, user device **102** selects particular data elements to include in contextual user interface element **112** based on the content of the webpage displayed (e.g., HTML content, XML content, metadata content, etc.). In other embodiments, user device selects data elements to include in the contextual user interface element using the instructions for providing the contextual user interface element (e.g., received in step **4***b*).

**[0093]** The illustrated process is shown to further include executing additional instructions to insert data from the contextual user interface element (step **9***b*). Step **9***b* may be performed in response to a user input received via a user interface element of user device **102**. For example, as described with reference to FIG. **2**, a user may drag and drop data elements from the contextual user interface element into form fields of the travel website. Dropping a data element into a space occupied by a form field may cause user device **102** to execute additional instructions for automatically inserting the value of the data element into the form field.

**[0094]** Still referring to FIG. **3**B, the illustrated process is shown to further include providing the completed web forms to travel provider **106** (step **10***b*). Step **10***b* may be performed subsequent to completion of steps **1***b*-**9***b* or may be performed incrementally as user device **102** navigates between web pages. In some embodiments, providing the completed web forms to travel provider **106** signifies completion of the travel-related action. In some embodiments, step **10***b* may be performed automatically by user device **102** upon executing the instructions (e.g., in step **7***b*).

**[0095]** Referring now to FIG. **4**, a detailed block diagram of remote server **104** is shown, according to an exemplary embodiment. Remote server **104** is shown to include a communications interface **150** and a processing circuit **160**. Communications interface **150** may include wired or wireless interfaces (e.g., jacks, antennas, transmitters, receivers, transceivers, wire terminals, Ethernet ports, WiFi transceivers, etc.) for conducting data communications with local or remote devices or systems. For example, communications interface **150** may allow remote server **104** to communicate with user device **102** and travel provider **106**.

**[0096]** Still referring to FIG. **4**, processing circuit **160** is shown to include a processor **162** and memory **164**. Processor **162** may be implemented as a general purpose processor, an application specific integrated circuit (ASIC), one or more field programmable gate arrays (FPGAs), a CPU, a GPU, a group of processing components, or other suitable electronic processing components.

**[0097]** Memory **164** may include one or more devices (e.g., RAM, ROM, Flash® memory, hard disk storage, etc.) for storing data. For example, memory **164** is shown to include a user information database **182**, an itinerary database **184**, and a site navigation database **186**. Databases **182**-**186** may be any type of memory device capable of user profile data, itinerary-specific data, site navigation data, or any other type of data used by remote server **104** and/or user device **102**. Databases **182**-**186** may include any type of non-volatile memory, media, or memory devices. For example, databases **182**-**186** may include semiconductor memory devices (e.g., EPROM, EEPROM, flash memory devices, etc.) magnetic disks (e.g., internal hard disks, removable disks, etc.), magneto-optical disks, and/or CD-ROM and DVD-ROM disks. In some embodiments, databases **182**-**186** may be local to remote server **104**. In other embodiments, databases **182**-**186** may be remote data storage devices connected with remote server **104** via a computer network (e.g., a LAN, WAN, the Internet, etc.). In some embodiments, databases **182**-**186** may be part of a data storage server or system capable of receiving and responding to queries for information.

**[0098]** Memory **164** may include one or more devices for completing and/or facilitating the various processes, layers, and modules described in the present disclosure. Memory **164** may comprise volatile memory or non-volatile memory. Memory **164** may include database components, object code components, script components, or any other type of information structure for supporting the various activities and information structures described in the present disclosure. In some implementations, memory **164** is communicably connected to processor **162** via processing circuit **160** and includes computer code (e.g., data modules stored in memory **164**) for executing one or more processes described herein.

**[0099]** Still referring to FIG. **4**, memory **164** is shown to include a user information module **166**. User information module **166** may be responsible for receiving and managing user-specific data. User information module **166** may receive user-specific data from user device **102** or other data sources and may store the user-specific data in user information database **182**. User information module **166** may be responsible writing user-specific information to user information database **182** and reading user-specific information from user information database **182**. User-specific data may include general user data that is not limited to a single travel itinerary (e.g., user profile data, user preferences, etc.). For example, user specific data may include a user's name, telephone num-

ber, home address, preferred language, travel preferences, billing information, account login information, or other information that may apply to a plurality of travel itineraries.

**[0100]** Still referring to FIG. **4**, memory **164** is shown to further include an itinerary management module **168**. Itinerary management module **168** may be responsible for receiving, managing, and updating itinerary-specific data. Itinerary management module **168** may receive itinerary-specific information from user device **102** or other data sources and may store itinerary-specific data in itinerary database **184**. Itinerary management module **168** may be responsible writing itinerary-specific information to itinerary database **184** and reading itinerary-specific information from itinerary database **184**. Itinerary-specific data may include data relating to particular travel arrangements. For example, when a user purchases a flight ticket, information relating to the travel arrangement (e.g., flight number, reservation number, departure time, departure location, passenger name, etc.) may provided to itinerary management module **168** and stored in itinerary database **184**.

**[0101]** In some embodiments, itinerary management module **168** interacts with travel provider **106** to retrieve detailed information relating to various travel arrangements and updates the itinerary-specific data in itinerary database **184** if any of the itinerary details change. In some embodiments, itinerary-specific data includes data relating to both a particular user and a particular travel arrangement. In other words, itinerary-specific data may include user-specific data. In some embodiments, the itinerary-specific data includes all the raw information necessary to perform a travel-related action.

**[0102]** Itinerary management module **168** may be configured to synchronize itinerary data with user device **102** in response to a synchronization request from user device **102**. Itinerary management module **168** may prepare updated itinerary data in response to the synchronization request and send the updated itinerary data (e.g., via communications interface **150**) to user device **102**.

**[0103]** Still referring to FIG. **4**, memory **164** is shown to further include a site navigation module **170**. Site navigation module **170** may be responsible for receiving, managing, and updating site-specific navigation data. Site navigation module **170** may receive site-specific navigation data from various travel providers and/or travel websites and store the site-specific navigation data in site navigation database **186**. Site navigation module **170** may be responsible writing site-specific navigation data to site navigation database **186** and reading site-specific navigation data from site navigation database **186**.

**[0104]** In some embodiments, site-specific navigation data includes data describing a sequence of steps required to perform a travel-related action for a particular travel website. For example, a particular travel website may require a user to login at a first webpage, enter a confirmation number at a second webpage, and finally click a confirmation button at a third web page. The site-specific navigation data may provide navigation logic for performing a particular travel-related action at a particular travel website. Site-specific navigation data may be extracted from travel websites, provided by travel provider **106**, or otherwise obtained from any other data source.

**[0105]** In some embodiments, site navigation module **170** manages a database of URLs for performing various travel-related actions. The URLs may indicate a particular webpage of a travel website for initiating a particular travel-related action. For example, within a travel website operated by an airline, the URL of the webpage for checking-in for a flight may be different than the URL of the webpage for changing a departure time or cancelling a flight reservation. Site navigation module **170** may maintain a list of direct URLs to the specific web pages for performing travel-related actions. Site navigation module **170** may store the URLs and the associated travel-related actions in site navigation database **186**. In some embodiments, site navigation module **170** provides a URL to user device **102** in response to a request for instructions for completing a travel-related action. The URL may be a direct link to the exact webpage for completing the requested travel-related action.

**[0106]** Still referring to FIG. **4**, memory **164** is shown to include a data synchronization module **172**. Data synchronization module **172** may be configured synchronize itinerary-specific data and instructions for performing a travel-related action with user device **102**. Synchronizing itinerary-specific data and instructions may include sending updated itinerary data and/or instructions to user device **102**. In some embodiments, data synchronization module **172** synchronizes an itinerary with user device **102** when an itinerary item is changed. Data synchronization module **172** may interact with itinerary management module **168** to determine whether an itinerary has been changed. Data synchronization module **172** may interact with site navigation module **170** to determine the information required by the identified travel website for completing the travel-related action.

**[0107]** In some embodiments, data synchronization module **172** determines whether the identified travel website is a supported website for automatically populating form fields. If the travel website is supported, data synchronization module **172** may determine that it is unnecessary to prepare instructions for presenting contextual user interface element **112**. However, if the travel website is unsupported, data synchronization module **172** may determine that instructions for presenting contextual user interface element **112** should be prepared.

**[0108]** Data synchronization module **172** may identify the information necessary to complete a travel-related action and interact with user information module **166**, itinerary management module **168**, and/or site navigation module **170** to obtain the required information. Data synchronization module **172** may call one or more of user-specific instructions module **174**, itinerary-specific instructions module **176**, navigation instructions module **178**, and contextual user interface element instructions module **180** to prepare instructions for performing the travel-related action.

**[0109]** Still referring to FIG. **4**, memory **164** is shown to include a user-specific instructions module **174**. User-specific instructions module **174** may be configured to generate instructions for providing user-specific information to a travel website. User-specific instructions module **174** may interact with data synchronization module **172** to identify the particular items of user-specific information for which instructions are required. User-specific instructions module **174** may generate instructions for providing the identified user-specific information from user device **102** to the travel website. In some embodiments, user-specific instructions may include instructions for automatically populating form fields of the travel website with user-specific data. The user-specific data

may be data already stored on user device **102** or data communicated to user device **102** along with the requested instructions.

**[0110]** Memory **164** is shown to further include an itinerary-specific instructions module **176**. Itinerary-specific instructions module **176** may be configured to generate instructions for providing itinerary-specific information to a travel website. Itinerary-specific instructions module **176** may interact with data synchronization module **172** to identify the particular items of itinerary-specific information for which instructions are required.

**[0111]** Itinerary-specific instructions module **176** may generate instructions for providing the identified itinerary-specific information from user device **102** to the travel website. In some embodiments, the itinerary-specific instructions may include instructions for populating form fields of the travel website with itinerary-specific data. The itinerary-specific data used to populate the form fields may be data already stored on user device **102** (e.g., in response to a synchronization request) or data communicated to user device **102** along with the requested instructions.

**[0112]** Still referring to FIG. **4**, memory **164** is shown to include a navigation instructions module **178**. Navigation instructions module **178** may be configured to generate instructions for navigating a travel website. Advantageously, the navigation instructions may be site-specific instructions relating to a particular travel website. The navigation instructions may include a URL of a webpage for initiating the travel-related action as well as a sequence of steps or actions necessary to complete the travel-related action. For example, a particular travel website may require a user to login at a first webpage, enter a confirmation number at a second webpage, and finally click a confirmation button at a third web page.

**[0113]** Navigation instructions module **178** may generate instructions for navigating from a webpage associated with the provided URL to a final webpage for completing the travel-related action. In some embodiments, the navigation instructions include multiple lines of computer code for automatically populating form fields of the travel website. In some embodiments, the navigation instructions include multiple lines of computer code for automatically following hyperlinks within the travel website for advancing to another webpage (e.g., the next webpage in the chain of web pages which must be completed/loaded for performing the travel-related action) or submitting the populated data to the travel provider.

**[0114]** Still referring to FIG. **4**, memory **164** is shown to include a contextual user interface element instructions module **180**. Contextual user interface element instructions module **180** may be configured to generate instructions for presenting contextual user interface element **112**. Instructions for presenting contextual user interface element **112** may include instructions for selecting particular data elements to include in contextual user interface element **112**. In some embodiments, the instructions include selection logic based on the content of the webpage displayed (e.g., HTML content, XML content, metadata content, etc.). In other embodiments, the instructions may include instructions to present specific data elements when a particular webpage is displayed.

**[0115]** Contextual user interface element instructions module **180** may generate instructions for inserting data from contextual user interface element **112** into an identified form field of the travel website. For example, as described with reference to FIG. **2**, a user may drag and drop data elements from contextual user interface element **112** into form fields of the travel website. Contextual user interface element instructions module **180** may generate instructions specifying that when a data element is dragged from contextual user interface element **112** into a space occupied by a form field, the value of the data element should be automatically inserted into the form field.

**[0116]** Referring now to FIG. **5**, a detailed block diagram of user device **102** is shown, according to an exemplary embodiment. User device **102** is shown to include communications interface **152**, user interface devices **154**, and a processing circuit **190**. Communications interface **152** may include wired or wireless interfaces (e.g., jacks, antennas, transmitters, receivers, transceivers, wire terminals, Ethernet ports, WiFi transceivers, etc.) for conducting data communications with local or remote devices or systems. For example, communications interface **152** may allow user device **102** to communicate with remote server **104** and/or travel provider **106**. Communications interface **152** may allow user device **102** to communicate with a wireless networking device (e.g., a wireless router, wireless-enabled computer, laptop, tablet, cell tower, etc.) or a wired networking device (e.g., via an Ethernet cable, a SATA cable, USB cable, or other physical data connection).

**[0117]** User interface devices **154** may include one or more user input devices (e.g., for receiving input from a user) and one or more user output devices (e.g., for presenting information to a user). User input devices may include devices that utilize touch-sensitive technology (e.g., capacitive touch, piezoelectric, etc.) field-of-effect technology (e.g., projected capacitive, electrostatic, etc.), as well as traditional input devices (e.g., keyboard, mouse, microphone, etc.). Input devices may include one or more buttons, keys, dials, sliders, microphones, or other elements capable of receiving tactile input from a user.

**[0118]** User output devices may further include an electronic display (e.g., a liquid crystal display (LCD), organic light emitting diode (OLED), thin film transmitter (TFT), or other monitor capable of displaying information or providing visual feedback to a user). In some embodiments, user output devices include a touch-sensitive display capable of both displaying information and receiving a user's touch input. In some embodiments, user input devices and user output devices are combined into an integrated touch-sensitive display device.

**[0119]** Still referring to FIG. **5**, processing circuit **190** is shown to include a processor **192** and memory **194**. Processor **192** may be implemented as a general purpose processor, an application specific integrated circuit (ASIC), one or more field programmable gate arrays (FPGAs), a CPU, a GPU, a group of processing components, or other suitable electronic processing components.

**[0120]** Memory **194** may include one or more devices (e.g., RAM, ROM, Flash® memory, hard disk storage, etc.) for storing data and/or computer code for completing and/or facilitating the various processes, layers, and modules described in the present disclosure. Memory **194** may comprise volatile memory or non-volatile memory. Memory **194** may include database components, object code components, script components, or any other type of information structure for supporting the various activities and information structures described in the present disclosure. In some implementations, memory **194** is communicably connected to proces-

sor **192** via processing circuit **190** and includes computer code (e.g., data modules stored in memory **194**) for executing one or more processes described herein.

**[0121]** In brief overview, memory **194** is shown to include a user interface module **196**, a data synchronization module **198**, an instruction request module **200**, an instruction injection module **202**, a web browser module **204**, a contextual user interface element module **206**, a navigation module **208**, and a form filling module **210**. Some or all of memory modules **196-210** may be part of an application configured to run on user device **102** (e.g., a mobile application).

**[0122]** User interface module **196** may be configured to generate a user interface for presentation to a user via user interface devices **154**. Advantageously, user interface module **196** may present a single user-friendly interface for interacting with many different travel websites without requiring a user to learn the interfaces associated with a variety of different travel websites. In some embodiments, user interface module **196** generates a user interface for presenting itinerary-specific information. User interface module **196** may create a user interface including one or more selectable options (e.g., buttons, icons, tiles, etc.) for initiating a travel-related action. An exemplary user interface which may be generated by user interface module **196** is described in greater detail with reference to FIG. **6**.

**[0123]** Still referring to FIG. **5**, memory **194** is shown to include a data synchronization module **198**. Data synchronization module **198** may be configured to retrieve updated data from remote server **104**. Updated data may include itinerary-specific data, user-specific data, or other travel-related data managed by remote server **104**. In some embodiments, data synchronization module **198** submits a request for updated data in response to a user input received via user interface devices **154**. In other embodiments, data synchronization module **198** submits a request for updated data periodically, automatically, or in response to another update trigger (e.g., launching a mobile application, viewing itinerary data for a particular travel arrangement, etc.). Data synchronization module **198** may receive itinerary-specific data from remote server **104** and store the itinerary-specific data within memory **194**.

**[0124]** In some embodiments, data synchronization module may be configured to receive instructions from remote server **104**. The instructions may include instructions for performing the travel-related action. The instructions for performing the travel-related action may be received from remote server **104** as part of the data synchronization.

**[0125]** Memory **194** is shown to further include an instruction request module **200**. Instruction request module **200** may be configured to submit a request for instructions for performing a travel-related action to remote server **104**. In some embodiments, instruction request module **200** is not necessary because the instructions may have already been received as part of a prior data synchronization. In other embodiments, instruction request module **200** may submit a request for instructions to remote server **104** in response to a user input received via user interface devices **154** requesting performance of a travel-related action. For example, user interface module **196** may generate a user interface including a selectable icon labeled "Flight check-in available." Instruction request module **200** may submit a request for instructions for performing the flight check-in in response to a user selection of the selectable icon.

**[0126]** In some embodiments, the request for instructions includes an indication of a particular travel arrangement and/or an indication of the particular travel-related action for which instructions are requested. Remote server **104** may use the indication of the particular travel arrangement and/or the indication of the particular travel-related action to generate a set of instructions for performing the travel-related action. Remote server may provide the requested instructions to user device **102**.

**[0127]** Still referring to FIG. **5**, memory **194** is shown to include a web browser module **204**. Web browser module **204** may include instructions for executing a web browser on user device **102**. In some embodiments, the web browser may be embedded within a mobile application running on user device **102**. Web browser module **204** may receive the requested instructions from remote server **104**. In some embodiments, the instructions include one or more URLs specifying the locations of web pages for performing the travel-related action. Web browser module **204** may be configured to download one or more web pages (i.e., website data) from a travel website using the URL information provided in the instructions.

**[0128]** Memory **194** is shown to further include an instruction injection module **202**. Instruction injection module **202** may receive the requested instructions from remote server **104**. Instruction injection module **202** may also receive the downloaded website data (i.e., "existing website data") from the travel website. The website data may include one or more website files (e.g., .htm files, etc.) which can be loaded by web browser module **204**. Instruction injection module **202** may create a modified website file by injecting by injecting the instructions into an existing website file. In some embodiments, the modified website file includes one or more form fields pre-populated with itinerary-specific and/or user-specific data. In some embodiments, the instructions are JavaScript® instructions. Injecting the instructions into the website file may include inserting the instructions into the existing website file as executable instructions.

**[0129]** Instruction injection module may provide the modified website file to web browser module **204**. Web browser module **204** may be configured to load the modified website file including the executable instructions injected therein. Loading the modified website file may cause web browser **204** to execute the injected instructions and perform operations according to the injected instructions. In some embodiments, the instructions include multiple lines of computer code for automatically navigating between pages of the travel website, instructions for automatically filling form fields of the travel website and/or instructions for presenting contextual user interface element **112** along with the existing website data. In some embodiments, the instructions are executed by web browser module **204** and it is web browser module **204** that performs the operations according to the instructions. In other embodiments, the instructions are executed by a separate data module of memory **194**.

**[0130]** Still referring to FIG. **5**, memory **194** is shown to include a contextual user interface element module **206**, a navigation module **208**, and a form-filling module **210**. Modules **206-210** may be configured to execute the instructions received from remote server **104**. In some embodiments, modules **206-210** may be components of web browser module **204**. In other embodiments, modules **206-210** may be conceptually or functionally separate data modules. For example, modules **206-210** may be modules of an application

running on device **102** (e.g., a mobile application) into which the web browser is embedded. In some embodiments, modules **206-210** execute instructions which have been injected into existing website data (e.g., by instruction injection module **202**). In other embodiments, modules **206-210** execute the instructions received from remote server **104** without requiring that the instructions be injected into website data.

**[0131]** Navigation module **208** may be configured to execute instructions for navigating a travel website. In some embodiments, the instructions for navigating a travel website are site-specific instructions relating to a particular travel website. The navigation instructions may include a URL of a webpage for initiating the travel-related action as well as a sequence of steps or actions necessary to complete the travel-related action. For example, a particular travel website may require a user to login at a first webpage, enter a confirmation number at a second webpage, and finally click a confirmation button at a third web page.

**[0132]** Navigation module **208** may execute instructions for navigating from a webpage associated with the provided URL to a final webpage for completing the travel-related action. In some embodiments, navigation module **208** causes web browser module **204** to automatically follow hyperlinks within the travel website for advancing to another webpage (e.g., the next webpage in the chain of web pages which must be completed/loaded for performing the travel-related action) or submitting the data (e.g., populated web forms) to a travel provider.

**[0133]** Form-filling module **210** may be configured to execute instructions for automatically populating form fields of the travel website with itinerary-specific data and/or user-specific data. Form-filing module **210** may populate form fields with user-specific and/or itinerary-specific data included in the instructions received from remote server **104** or with data previously stored on user device **102** (e.g., by data synchronization module **198**). In some embodiments, form-filling module populates form fields according to literal instructions received from remote server **104**. In other embodiments, form-filling module **210** populates form fields according to independent form-filling logic (e.g., in place of or in addition to the instructions received from remote server **104**). For example, form-filling module **210** may identify form fields based on the content of the website data (e.g., metadata, HTML data, etc.) and automatically fill identified form fields with itinerary-specific or user-specific data designated for an identified form field.

**[0134]** Still referring to FIG. **5**, memory **194** is shown to include a contextual user interface element module **206**. Contextual user interface element module **206** may be configured to present a contextual user interface element (e.g., contextual user interface element **112**) along with the website data. Contextual user interface element **112** may include one or more of the itinerary-specific data received from remote server **104**. Advantageously, contextual user interface element module **206** may be used to display itinerary-specific data in a format that can be easily applied to form fields in the travel website when automatic population is unavailable (e.g., for unsupported or recently-changed websites).

**[0135]** In some embodiments some embodiments, contextual user interface element module **206** may be configured to display data elements relevant to a particular web page. Contextual user interface element module **206** may determine which data elements are relevant to a particular web page based on the content of the web page data (e.g., HTML data, XML data, form field names, etc.). Contextual user interface element module **206** may add, remove, re-organize, or otherwise adjust the data elements presented in contextual user interface element **112** based on the context provided by the web page data. For example, as user device **102** navigates from page to page (e.g., automatically or in response to a user input), contextual user interface element module **206** may adjust the data elements displayed in contextual user interface element **112**. In some embodiments, contextual user interface element module **206** identifies itinerary-specific data elements corresponding to the form fields in the web page (e.g., based on the content of the web page) and presents the identified data elements in contextual user interface element **112**.

**[0136]** In some embodiments, contextual user interface element module **206** executes instructions generated by remote server **104** (e.g., by contextual user interface element instructions module **180**) for presenting contextual user interface element **112**. Instructions for presenting contextual user interface element **112** may include instructions for selecting particular data elements to include in contextual user interface element **112**. In some embodiments, the instructions include selection logic based on the content of the webpage displayed. In other embodiments, the instructions specify particular data elements to present when a particular webpage is displayed.

**[0137]** Contextual user interface element module **206** may be configured to execute additional instructions to insert data from contextual user interface element **112** into a form field of the travel website. For example, as described with reference to FIG. **2**, a user may drag and drop data elements from contextual user interface element **112** into form fields of the travel website. Dropping a data element into a space occupied by a form field may cause contextual user interface element module **206** to execute additional instructions for automatically inserting the value of the data element into the form field.

**[0138]** Referring now to FIG. **6**, a drawing of a user interface **300** which may be generated by user interface module **196** is shown, according to an exemplary embodiment. User interface **300** may be presented via a user interface element (e.g., user interface devices **154**) of user device **102**. Advantageously, user interface **300** may be used to facilitate user interactions with many different travel websites, thereby eliminating the need for users to learn and navigate multiple different user interfaces for each new travel website.

**[0139]** User interface **300** is shown to include itinerary-specific information **302**. Itinerary-specific information **302** may be received from remote server **104** in response to a request for itinerary synchronization from data synchronization module **198**. As illustrated in FIG. **6**, itinerary-specific information may include information relating to a particular flight. For example, itinerary-specific information **302** is shown to include a flight name (e.g., "AA **1**"), an airline name (e.g., "American Airlines"), a departure location (e.g., "New York (JFK)"), an arrival location (e.g., "Los Angeles (LAX)"), a terminal "e.g., "Terminal: 8"), and a departure time (e.g., "9:00 AM").

**[0140]** User interface **300** is shown to further include a selectable icon **304**. Selectable icon **304** may be displayed when a travel-related action is available to be performed. For example, online check-in for a particular flight may become available one hour before the flight departure time. User device **102** may receive a notification from remote server **104** or may independently determine that online flight check-in is

available when the current time is within the one hour window before the flight departure time. In response to a determination (e.g., by remote server **104** or by user device **102**) that a travel-related action is available, selectable icon **304** may be displayed within user interface **300**.

**[0141]** Selectable icon **304** is shown displaying an indication of the travel-related action (e.g., "Flight check-in") associated with selectable icon **304**. Selecting selectable icon **304** (e.g., tapping, clicking, etc.) may cause user device **102** to submit a request for instructions for performing the associated travel-related action. Additionally, selecting selectable icon **304** may cause user device **102** (e.g., a web browser running on user device **102**) to navigate directly to a webpage through which the associated travel-related action may be performed. For example, selecting selectable icon **304** may cause user device **102** to navigate to a webpage for performing online check-in for the flight identified by itinerary-specific information **302**.

**[0142]** Referring now to FIGS. **7-12**, a user interface **400** for presenting itinerary-specific data in a contextual user interface element is shown, according to an exemplary embodiment. In some embodiments, user interface **400** is presented in response to a user selecting selectable icon **304** in user interface **300**. User interface **400** may be presented by user device **102** (e.g., via user interface devices **154**) and may be generated by an application running on user device **102** (e.g., by contextual user interface element module **206**).

**[0143]** User interface **400** may be presented concurrently with one or more web pages of a travel website through which a travel-related action can be performed. For example, referring specifically to FIG. **7**, user interface **400** is shown overlaid with a webpage through which a user can check-in for a flight. The webpage may be displayed by user device **102** (e.g., via web browser module **204**) in response to a user selection of selectable icon **304** (e.g., via user interface **300**). In some implementations, the webpage includes one or more form fields which must be completed to perform the travel-related action. For example, the webpage is shown to include a "Last Name" form field **404** and a "Reservation #" form field **406**.

**[0144]** Still referring to FIG. **7**, user interface **400** is shown to include an information box **402**. Information box **402** may display a current status of a data fetching process. For example, information box **402** may be displayed while user device **102** is retrieving the itinerary-specific or user-specific data from remote server **104**.

**[0145]** Referring now to FIG. **8**, user interface **400** is shown to include a contextual user interface element **408**. Contextual user interface element **408** may be displayed after the itinerary-specific or user-specific data is received at user device **102**. Contextual user interface element **408** is shown to include a plurality of data elements **410-416**. Data elements **410-416** may correspond to particular items of the itinerary-specific data (e.g., flight confirmation number, departure airport, reservation number, etc.). In some embodiments, data elements displayed in contextual user interface element **408** include an indication of the type of data element (e.g., data element name, description, title, etc.) and a value of the data element. For example, the value of "Reservation #" data element **414** is shown as "BQCLW." Advantageously, contextual user interface element **408** can be used to display itinerary-specific data in a format that can be easily applied to form fields in the travel website when automatic population is unavailable.

**[0146]** In some embodiments, user interface **400** may be configured to display data elements in contextual user interface element **408** which are relevant the webpage being concurrently displayed. User device **102** may determine which data elements are relevant to a particular web page based on the content of the web page data (e.g., HTML data, XML data, metadata, form field names, etc.) or based on instructions/logic received from remote server **104**. User device **102** may add, remove, re-organize, or otherwise adjust the data elements presented in contextual user interface element **408** when a new webpage is loaded.

**[0147]** User interface **400** is shown to further include a toggle button **418**. Selecting toggle button **418** (e.g., tapping, clicking, etc.) may cause contextual user interface element **408** to be displayed (e.g., as shown in FIGS. **8-11**) or hidden (e.g., as shown in FIG. **12**).

**[0148]** Referring now to FIG. **9**, in some embodiments, user interface **400** presents the data elements displayed in contextual user interface element **408** as selectable icons. A user may select a data element by tapping, clicking, highlighting, or otherwise interacting with the selectable icon associated with the data element. For example, a user may select "Reservation #" data element **414** by tapping or clicking an area within the selectable icon (e.g., at click/tap location **420**). In some embodiments, selecting an icon may cause the icon to change colors, become highlighted, emphasized, bolded, outlined, or otherwise marked as having been selected.

**[0149]** Referring now to FIG. **10**, in some embodiments, user interface **400** presents the data elements displayed in contextual user interface element **408** as movable icons. A user may move an icon by dragging the icon from its original location within contextual user interface element **408** to another location within user interface **400** (e.g., inside or outside contextual user interface element **408**). In some embodiments, user interface **400** presents contextual user interface element **408** as a variable-transparency window. For example, when an icon is moved out of contextual user interface element **408** (e.g., as shown in FIG. **10**), user interface **400** may cause contextual user interface element **408** to appear translucent or transparent. Advantageously, increasing the transparency of contextual user interface element **408** may allow a user to see any text or form fields which may be hidden under contextual user interface element **408**.

**[0150]** Referring now to FIG. **11**, user interface **400** may allow data elements which have been dragged out of contextual user interface element **408** to be dropped into one or more form fields of the web page. For example, data element **414** can be dragged to an area occupied by "Reservation #" form field **406** and dropped into form field **406** (e.g., by releasing a mouse button, removing a finger from a touch screen, etc.). Advantageously, dragging and dropping a data element into a form field may cause the value of the data element to be copied into the form field.

**[0151]** Referring now to FIG. **12**, user interface **400** is shown displaying the value of "Reservation #" data element **414** (e.g., "BQCLW") in form field **406**. The value of data element **414** may be automatically copied into form field **406** in response to a user dragging and dropping data element **414** into a space occupied by form field **406**. This automatic copying may allow a user to quickly and easily complete any required web forms without manually entering the itinerary-specific data.

**[0152]** Referring now to FIG. **13**, a flowchart of a process **500** for synchronizing itinerary-specific data and preparing/

synchronizing instructions for performing a travel-related action is shown, according to an exemplary embodiment. Process **500** may be performed by remote server **104** using processing circuit **160** and one or more memory modules contained therein (e.g., memory modules **166-180**).

**[0153]** Process **500** is shown to initiating synchronization of itinerary-specific data and instructions for performing a travel-related action (step **502**). In some embodiments, the itinerary-specific data relates to a particular travel itinerary. In some implementations, step **502** is performed by data synchronization module **172**. Data synchronization module **172** may interact with itinerary management module **168** and site navigation module **170** to identify the itinerary-specific data and determine the information necessary to prepare the instructions. In some embodiments, the travel-related action may be based on the particular travel itinerary. In some embodiments, step **502** includes identifying a travel website through which the travel-related action will be performed. Synchronization may be initiated in response to a change in the itinerary-specific data stored at remote server **104** (e.g., in itinerary database **184**).

**[0154]** In some embodiments, step **502** includes determining whether the identified travel website is a supported website for automatically populating form fields. If the travel website is supported, it may be unnecessary to prepare instructions for presenting contextual user interface element **112**. However, if the travel website is unsupported, step **502** may include determining that instructions for presenting contextual user interface element **112** should be prepared.

**[0155]** In some embodiments, step **502** includes identifying the information necessary to complete the travel-related action. Travel-related actions may include checking-in for a flight or a hotel, creating new travel arrangements, confirming or changing existing travel arrangements, canceling travel arrangements, or other types of interactions between a user and a travel provider. Data synchronization module **172** may interact with user information module **166**, itinerary management module **168**, and/or site navigation module **170** to obtain the required information.

**[0156]** Still referring to FIG. **13**, process **500** is shown to include retrieving itinerary-specific data relating to the particular travel itinerary (step **504**). In some implementations, step **504** may be performed by itinerary management module **168**. The itinerary-specific data may be retrieved from an itinerary database (e.g., itinerary database **184**). Itinerary-specific data may include data relating to particular travel arrangements. For example, when a user purchases a flight ticket, information relating to the travel arrangement (e.g., flight number, reservation number, departure time, departure location, passenger name, etc.) may provided to itinerary management module **168** and stored in itinerary database **184**.

**[0157]** In some embodiments, step **504** includes interacting with travel provider **106** to retrieve detailed information relating to various travel arrangements. In some embodiments, itinerary-specific data includes data relating to both a particular user and a particular travel arrangement. In other words, itinerary-specific data may include user-specific data. In some embodiments, the itinerary-specific data includes all the raw information necessary to perform a travel-related action.

**[0158]** Still referring to FIG. **13**, process **500** is shown to include identifying information for accessing a travel website for performing the travel-related action (step **506**). In some implementations, step **506** is performed by site navigation module **170**. The website for performing the travel-related action may be a website operated by a travel provider through which the travel-related action may be performed.

**[0159]** The information for accessing the travel website may be a URL of a specific webpage of the travel website. The URL may indicate a particular webpage of a travel website for initiating a particular travel-related action. For example, within a travel website operated by an airline, the URL of the webpage for checking-in for a flight may be different than the URL of the webpage for changing a departure time or cancelling a flight reservation. In some embodiments, step **506** includes accessing a list of direct URLs to the specific web pages for performing travel-related actions. The list of direct URLs and the associated travel-related actions may be retrieved from site navigation database **186**.

**[0160]** Still referring to FIG. **13**, process **500** is shown to include generating instructions for performing the travel-related action (step **508**). The instructions may include multiple lines of computer code for automatically navigating the identified travel website and multiple lines of computer code for automatically providing the itinerary-specific data to the travel website. In some implementations, step **508** is performed by navigation instructions module **178** and or itinerary-specific instructions module **176**. In some embodiments, step **508** includes interacting with data synchronization module **172** to identify the particular items of itinerary-specific data for which instructions are required.

**[0161]** In some embodiments, the instructions include multiple lines of computer code for populating form fields of the travel website with itinerary-specific data. The itinerary-specific data used to populate the form fields may be data already stored on user device **102** (e.g., in response to a synchronization request) or data communicated to user device **102** along with the requested instructions.

**[0162]** In some embodiments, the instructions include multiple lines of computer code for navigating from a webpage associated with the provided URL to a final webpage for completing the travel-related action. The multiple lines of computer code for automatically navigating the identified travel website may be site-specific instructions relating to a particular travel website. The navigation instructions may include a URL of a webpage for initiating the travel-related action as well as a sequence of steps or actions necessary to complete the travel-related action. For example, a particular travel website may require a user to login at a first webpage, enter a confirmation number at a second webpage, and finally click a confirmation button at a third web page.

**[0163]** In some embodiments, the navigation instructions include multiple lines of computer code for automatically following hyperlinks within the travel website for advancing to another webpage (e.g., the next webpage in the chain of web pages which must be completed/loaded for performing the travel-related action) or submitting the populated data to the travel provider.

**[0164]** In some embodiments, the instructions include a first set of instructions designated for injection into a website file and a second set of instructions designated for an application running on the user device. The first set of instructions may be injected into a website file whereas the second set of instructions may not be injected into the website file. The second set of instructions may provide instructions regarding how the injection should be performed.

**[0165]** Still referring to FIG. **13**, process **500** is shown to include providing the itinerary-specific data, the information for accessing the travel website, and the instructions for performing the travel-related action to the user device (step **510**). Step **510** may be performed by sending the multiple lines of computer code and travel website URL from remote server **104** to user device **102** (e.g., via communications interface **150**). User device **102** may receive the URL and multiple lines of computer code, navigate to the URL, and automatically perform the travel-related action by executing the instructions provided by the computer code.

**[0166]** Referring now to FIG. **14**, a flowchart of a process **600** for facilitating interactions between a travel website and a user device is shown, according to an exemplary embodiment. Process **600** may be performed by user device **102** using processing circuit **190** and one or more memory modules contained therein (e.g., memory modules **196-210**).

**[0167]** Process **600** is shown to include receiving, at a user device, itinerary-specific data, information for accessing a travel website, and instructions for performing a travel-related action (step **602**). In some embodiments, the itinerary-specific data, information for accessing a travel website, and instructions for performing a travel-related action may be received from remote server **104**. The information and instructions received in step **602** may be the same or similar to the information and instructions generated by the remote server in steps **504-508** of process **500**. For example, itinerary-specific data may include data relating to particular travel arrangements. The information identifying the travel website may be a URL of a specific webpage of the travel website. The URL may indicate a particular webpage of a travel website for initiating a particular travel-related action.

**[0168]** In some embodiments, the instructions for performing the travel-related action include multiple lines of computer code for automatically navigating the identified travel website and multiple lines of computer code for automatically providing itinerary-specific data to the travel website. The multiple lines of computer code for automatically providing itinerary-specific data to the travel website may include computer code for populating form fields of the travel website with itinerary-specific data. The itinerary-specific data used to populate the form fields may be data already stored on user device **102** (e.g., in response to a precious synchronization request) or data communicated to user device **102** along with the requested instructions.

**[0169]** In some embodiments, the instructions for performing the travel-related action include multiple lines of computer code for navigating from a webpage associated with the provided URL to a final webpage for completing the travel-related action. The multiple lines of computer code for automatically navigating the identified travel website may be site-specific instructions relating to a particular travel website. The navigation instructions may include a URL of a webpage for initiating the travel-related action as well as a sequence of steps or actions necessary to complete the travel-related action. In some embodiments, the navigation instructions include multiple lines of computer code for automatically following hyperlinks within the travel website for advancing to another webpage (e.g., the next webpage in the chain of web pages which must be completed/loaded for performing the travel-related action) or submitting the populated data to the travel provider.

**[0170]** In some embodiments, the instructions for performing the travel-related action include a first set of instructions designated for injection into a website file and a second set of instructions designated for an application running on the user device. The first set of instructions may be injected into a website file whereas the second set of instructions may not be injected into the website file. The second set of instructions may provide instructions regarding how the injection should be performed or otherwise used to configure an application running on the user device.

**[0171]** Process **600** is shown to include receiving, at the user device, an input requesting performance of a travel-related action by the user device (step **604**). The input may be a user input received via user interface devices **154**. In some embodiments, the input requesting performance of a travel-related action may be a user selection of a selectable icon presented via a user interface (e.g., user interface **300**). For example, as described with reference to FIG. **6**, user interface **300** may include a selectable icon **304**.

**[0172]** Selectable icon **304** may be displayed when a travel-related action is available to be performed. For example, online check-in for a particular flight may become available one hour before the flight departure time. User device **102** may receive a notification from remote server **104** or may independently determine that online flight check-in is available when the current time is within the one hour window before the flight departure time. In response to a determination (e.g., by remote server **104** or by user device **102**) that a travel-related action is available, selectable icon **304** may be displayed within user interface **300**. In some embodiments, the selectable icon includes an indication of the travel-related action (e.g., "Flight check-in") associated with the selectable icon.

**[0173]** Still referring to FIG. **14**, process **600** is shown to include using the instructions and the itinerary-specific data to automatically navigate the identified travel website and perform the travel-related action (step **606**). In some implementations, step **606** is performed by navigation module **208** and/or form-filling module **210**. Step **606** may include automatically navigating from a webpage associated with the provided URL to a final webpage for completing the travel-related action, automatically following hyperlinks within the travel website for advancing to another webpage, and/or automatically submitting itinerary-specific data to the travel provider.

**[0174]** In some embodiments, step **606** includes automatically populating form fields with user-specific and/or itinerary-specific data. The data may be included in the instructions received from remote server **104** previously stored on user device **102** (e.g., by data synchronization module **198**). Step **606** may include populating form fields according to literal instructions received from remote server **104** or according to independent form-filling logic (e.g., in place of or in addition to the instructions received from remote server **104**). For example, step **606** may include identifying form fields based on the content of the website data (e.g., metadata, HTML data, etc.) and automatically filling identified form fields with itinerary-specific or user-specific data. Step **606** is described in greater detail with reference to FIG. **18**.

**[0175]** Referring now to FIG. **15**, a flowchart of a process **700** for facilitating interactions between a travel website and a user device is shown, according to an exemplary embodiment. Process **700** may be performed by remote server **104** using processing circuit **160** and one or more memory modules contained therein (e.g., memory modules **166-180**).

**[0176]** Process **700** is shown to initiating synchronization of itinerary-specific data and instructions for performing a travel-related action (step **702**). In some embodiments, the itinerary-specific data relates to a particular travel itinerary. In some implementations, step **702** is performed by data synchronization module **172**. Data synchronization module **172** may interact with itinerary management module **168** and site navigation module **170** to identify the itinerary-specific data and determine the information necessary to prepare the instructions. In some embodiments, the travel-related action may be based on the particular travel itinerary. In some embodiments, step **702** includes identifying a travel website through which the travel-related action will be performed. Synchronization may be initiated in response to a change in the itinerary-specific data stored at remote server **104** (e.g., in itinerary database **184**).

**[0177]** In some embodiments, step **702** includes determining whether the identified travel website is a supported website for automatically populating form fields. If the travel website is supported, it may be unnecessary to prepare instructions for presenting contextual user interface element **112**. However, if the travel website is unsupported, step **702** may include determining that instructions for presenting contextual user interface element **112** should be prepared.

**[0178]** In some embodiments, step **702** includes identifying the information necessary to complete the travel-related action. Travel-related actions may include checking-in for a flight or a hotel, creating new travel arrangements, confirming or changing existing travel arrangements, canceling travel arrangements, or other types of interactions between a user and a travel provider. Data synchronization module **172** may interact with user information module **166**, itinerary management module **168**, and/or site navigation module **170** to obtain the required information.

**[0179]** Still referring to FIG. **15**, process **700** is shown to include retrieving itinerary-specific data relating to the particular travel itinerary (step **704**). In some implementations, step **704** may be performed by itinerary management module **168**. The itinerary-specific data may be retrieved from an itinerary database (e.g., itinerary database **184**). Itinerary-specific data may include data relating to particular travel arrangements. For example, when a user purchases a flight ticket, information relating to the travel arrangement (e.g., flight number, reservation number, departure time, departure location, passenger name, etc.) may provided to itinerary management module **168** and stored in itinerary database **184**.

**[0180]** In some embodiments, step **704** includes interacting with travel provider **106** to retrieve detailed information relating to various travel arrangements. In some embodiments, itinerary-specific data includes data relating to both a particular user and a particular travel arrangement. In other words, itinerary-specific data may include user-specific data. In some embodiments, the itinerary-specific data includes all the raw information necessary to perform a travel-related action.

**[0181]** Still referring to FIG. **15**, process **700** is shown to include identifying information for accessing a travel website for performing the travel-related action (step **706**). In some implementations, step **506** is performed by site navigation module **170**. The website for performing the travel-related action may be a website operated by a travel provider through which the travel-related action may be performed.

**[0182]** The information for accessing the travel website may be a URL of a specific webpage of the travel website. The URL may indicate a particular webpage of a travel website for initiating a particular travel-related action. For example, within a travel website operated by an airline, the URL of the webpage for checking-in for a flight may be different than the URL of the webpage for changing a departure time or cancelling a flight reservation. In some embodiments, step **706** includes accessing a list of direct URLs to the specific web pages for performing travel-related actions. The list of direct URLs and the associated travel-related actions may be retrieved from site navigation database **186**.

**[0183]** Still referring to FIG. **15**, process **700** is shown to include generating instructions for presenting the itinerary-specific data in a contextual user interface element on the user device (step **708**). In some implementations, step **708** is performed by contextual user interface element instructions module **180**. Instructions for presenting the itinerary-specific data in a contextual user interface element may include instructions for selecting particular data elements to include in contextual user interface element **112**. In some embodiments, the instructions include selection logic based on the content of the webpage displayed (e.g., HTML content, XML content, metadata content, etc.). In other embodiments, the instructions may include instructions to present specific data elements when a particular webpage is displayed.

**[0184]** In some embodiments, step **708** includes generating instructions for inserting data from contextual user interface element **112** into an identified form field of the travel website. For example, a user may drag and drop data elements from contextual user interface element **112** into form fields of the travel website. Step **708** may include generating instructions specifying that when a data element is dragged from contextual user interface element **112** into a space occupied by a form field, the value of the data element should be automatically inserted into the form field.

**[0185]** Still referring to FIG. **15**, process **700** is shown to include providing the itinerary-specific data, the information for accessing the travel website, and the instructions for presenting the itinerary-specific data in the contextual user interface element to the user device (step **710**). Step **710** may be performed by sending the instructions for presenting the itinerary-specific data and travel website URL from remote server **104** to user device **102** (e.g., via communications interface **150**). User device **102** may receive the URL and instructions, navigate to the URL, and present one or more of the itinerary-specific data in the contextual user interface element according to the instructions.

**[0186]** Referring now to FIG. **16**, a flowchart of a process **800** for facilitating interactions between a travel website and a user device is shown, according to an exemplary embodiment. Process **800** may be performed by user device **102** using processing circuit **190** and one or more memory modules contained therein (e.g., memory modules **196-210**).

**[0187]** Process **800** is shown to include receiving, at a user device, itinerary-specific data, information for accessing a travel website, and instructions for presenting the itinerary-specific data in a user interface element (step **802**). In some embodiments, the itinerary-specific data, information for accessing a travel website, and instructions for performing a travel-related action may be received from remote server **104**. The information and instructions received in step **802** may be the same or similar to the information and instructions generated by the remote server in steps **704-708** of process **700**.

For example, itinerary-specific data may include data relating to particular travel arrangements. The information identifying the travel website may be a URL of a specific webpage of the travel website. The URL may indicate a particular webpage of a travel website for initiating a particular travel-related action.

**[0188]** Instructions for presenting the itinerary-specific data in a contextual user interface element may include multiple lines of computer code for selecting particular data elements to include in contextual user interface element **112**. In some embodiments, the instructions include selection logic based on the content of the webpage displayed (e.g., HTML content, XML content, metadata content, etc.). In other embodiments, the instructions may include instructions to present specific data elements when a particular webpage is displayed.

**[0189]** In some embodiments, the instructions for presenting the itinerary-specific data in a contextual user interface element include multiple lines of computer code for inserting data from contextual user interface element **112** into an identified form field of the travel website. For example, a user may drag and drop data elements from contextual user interface element **112** into form fields of the travel website. In some embodiments, the instructions for presenting the itinerary-specific data in a contextual user interface element include multiple lines of computer code specifying that when a data element is dragged from contextual user interface element **112** into a space occupied by a form field, the value of the data element should be automatically inserted into the form field.

**[0190]** Still referring to FIG. **16**, process **800** is shown to include receiving, at the user device, an input requesting performance of a travel-related action by the user device (step **804**). The input may be a user input received via user interface devices **154**. In some embodiments, the input requesting performance of a travel-related action may be a user selection of a selectable icon presented via a user interface (e.g., user interface **300**). For example, as described with reference to FIG. **6**, user interface **300** may include a selectable icon **304**.

**[0191]** Selectable icon **304** may be displayed when a travel-related action is available to be performed. For example, online check-in for a particular flight may become available one hour before the flight departure time. User device **102** may receive a notification from remote server **104** or may independently determine that online flight check-in is available when the current time is within the one hour window before the flight departure time. In response to a determination (e.g., by remote server **104** or by user device **102**) that a travel-related action is available, selectable icon **304** may be displayed within user interface **300**. In some embodiments, the selectable icon includes an indication of the travel-related action (e.g., "Flight check-in") associated with the selectable icon.

**[0192]** Still referring to FIG. **16**, process **800** is shown to include presenting the itinerary-specific data in a contextual user interface element on the user device concurrently with a webpage of the travel website (step **806**). In some implementations, step **806** may be performed by contextual user interface element module **206**. Advantageously, presenting itinerary-specific data in a contextual user interface element may facilitate application of such data to form fields in the travel website when automatic population is unavailable (e.g., for unsupported or recently-changed websites). Itinerary-specific data may be presented in the contextual user interface element as selectable and/or movable icons.

**[0193]** In some embodiments, step **806** includes presenting data elements relevant to a particular web page. Step **806** may include determining which data elements are relevant to a particular web page based on the content of the web page data (e.g., HTML data, XML data, form field names, etc.). As user device **102** navigates from page to page (e.g., automatically or in response to a user input), step **806** may include adjusting the data elements displayed in the contextual user interface element.

**[0194]** In some embodiments, step **806** includes executing instructions generated by remote server **104** (e.g., by contextual user interface element instructions module **180**) for presenting contextual user interface element **112**. Instructions for presenting contextual user interface element **112** may include instructions for selecting particular data elements to include in contextual user interface element **112**. In some embodiments, the instructions include selection logic based on the content of the webpage displayed. In other embodiments, the instructions specify particular data elements to present when a particular webpage is displayed.

**[0195]** Still referring to FIG. **16**, in some embodiments, process **800** further includes copying the itinerary-specific data from the contextual user interface element to a form field of the travel website (step **808**). Step **808** may include executing additional instructions to insert data from contextual user interface element **112** into a form field of the travel website. For example, as previously described, a user may drag and drop data elements from contextual user interface element **112** into form fields of the travel website. Step **808** may be performed in response to a user dropping a data element into a space occupied by a form field. Executing the additional instructions may cause user device **102** to automatically insert the value of the data element into the form field.

**[0196]** Referring now to FIG. **17**, a flowchart of a process **900** for facilitating interactions between a user device and a plurality of different travel websites is shown, according to an exemplary embodiment. Process **900** may be performed by user device **102** using processing circuit **190** and one or more memory modules contained therein (e.g., memory modules **196-210**). In some implementations, process **900** may be controlled by the instructions received by user device **102** (e.g., from remote server **104**) for completing a travel-related action.

**[0197]** Process **900** is shown to include identifying a set of itinerary-specific data elements required for completing a travel-related action (step **902**). Typically, the itinerary-specific data elements required for completing a travel-related action may depend on a variety of factors. For example, the information required for checking-in for a flight may be different than the information required for cancelling a hotel reservation. Additionally, different travel providers and travel websites may require different information from users for completing similar travel-related actions. Advantageously, step **902** may be performed to identify the particular itinerary-specific data elements required for performing a particular travel-related action at a particular travel website.

**[0198]** In some embodiments, step **902** includes receiving a list of itinerary-specific data elements required for completing the travel-related action from remote server **104**. Alternatively, itinerary-specific data elements may be identified by user device **102** based on the content of the travel website for performing the travel related action, the type of travel-related action, or any other relevant identification criteria.

**[0199]** Still referring to FIG. **17**, process **900** is shown to include determining, for each of the identified data elements, whether stored itinerary-specific data includes a corresponding data value (step **904**). Step **904** may include loading itinerary-specific data from a local memory of user device **102** and determining whether the data includes data values for each of the data elements required for completing the travel-related action. The itinerary-specific data may have been received by user device **102** during a prior synchronization with remote server **104** (e.g., as described with reference to FIG. **13**).

**[0200]** Process **900** is shown to further include assigning data values to the identified data elements required for completing the travel-related action using the stored itinerary-specific data (step **906**). Step **906** may include extracting a data value from the stored itinerary-specific data for each of the identified data elements and assigning the extracted data value to the corresponding itinerary-specific data elements. For example, a stored value for a flight reservation number may be assigned to a "Flight Reservation #" data element. In some embodiments, step **906** may include obtaining any missing data values from remote server **104** (e.g., by re-synchronizing the itinerary-specific data, by querying remote server **104** for supplemental data, etc.).

**[0201]** Still referring to FIG. **17**, process **900** is shown to include identifying a data type associated with each of the assigned data values (step **908**) and converting the assigned data values to a uniform format (step **910**). Values for the itinerary-specific data elements may exist in a variety of data types (e.g., different formats, different encoding, different language, etc.). The variety of disparate data types may result from itinerary-specific data being gathered from many different travel providers. Advantageously, steps **908** and **910** can be performed to harmonize the data from many different travel providers by converting the data to a single, easily comprehensible format, thereby facilitating interactions between user device **102** and the many different travel providers.

**[0202]** Process **900** is shown to include identifying one or more web controls of a website for completing the travel-related action (step **912**). Web controls may be elements of a website which allow for interaction with the website. For example, web controls may include text controls for entering text into a form field of the website, selection controls for selecting a particular element of the website (e.g., in a drop-down box, as a selectable icon, etc.), navigation controls for navigating through multiple pages of the website (e.g., via embedded hyperlinks), or any other controls through which a website can receive a user interaction.

**[0203]** Step **912** may include identifying web controls of the travel website which may be used to complete the travel-related action. For example, step **912** may include identifying text controls for entering itinerary-specific data into an empty form field of a travel website, identifying navigation controls for advancing to another webpage of the travel website once the itinerary-specific data has been entered, and/or identifying any other controls which would normally be operated/manipulated by a user (e.g., by manually entering text, manually clicking a link, etc.) when performing the travel-related action.

**[0204]** Still referring to FIG. **17**, process **900** is shown to include injecting code for automatically activating the identified web controls (step **914**). In some embodiments, step **914** includes injecting code into a website file which has been downloaded from the travel website and loaded by a web browser running on a mobile device. The code may include multiple lines of computer code for performing the travel-related action.

**[0205]** Advantageously, the code may include executable instructions (e.g., JavaScript® instructions) for automatically activating one or more of the identified web controls. For example, the injected code may include instructions for automatically entering a data value into a form field of the travel website, instructions for automatically advancing to another page of the travel website, and/or code for automatically performing any type of action/interaction which would normally be performed by a user. The code may mimic manual actions such as pressing a button, selecting a value from a dropdown list, entering text, or any other action which would typically be performed by a user to complete the travel-related action.

**[0206]** Referring now to FIG. **18**, a flowchart of a process **1000** for automatically performing travel-related actions is shown, according to an exemplary embodiment. Process **1000** may be performed by user device **102** using processing circuit **190** and one or more memory modules contained therein (e.g., memory modules **196-210**). In some implementations, process **1000** may be controlled by the instructions received by user device **102** (e.g., from remote server **104**) for completing a travel-related action.

**[0207]** Process **1000** is shown to include identifying a set of itinerary-specific data elements relevant to a particular webpage (step **1002**). The itinerary-specific data elements relevant to a particular webpage may be based on the information required to be entered into the webpage (e.g., in form fields). The information required by a webpage depend on a variety of factors. For example, different travel providers and travel websites may require different information from users for completing the same travel-related action. Additionally, the information required by a webpage may depend on the type of travel-related action which can be performed through the webpage. Furthermore, a single travel-related action may require information to be entered into multiple web pages. Step **1002** may be performed to identify the particular itinerary-specific data elements required by a particular webpage for performing a particular travel-related action at a particular travel website.

**[0208]** Still referring to FIG. **18**, process **1000** is shown to include determining, for each of the identified data elements, whether stored itinerary-specific data includes a corresponding data value (step **1004**). Step **1004** may include loading itinerary-specific data from a local memory of user device **102** and determining whether the data includes data values for each of the data elements required for completing the travel-related action. The itinerary-specific data may have been received by user device **102** during a prior synchronization with remote server **104** (e.g., as described with reference to FIG. **13**).

**[0209]** Process **1000** is shown to further include assigning data values to the identified data elements relevant to the particular webpage using the stored itinerary-specific data (step **1006**).

**[0210]** Step **1006** may include extracting a data value from the stored itinerary-specific data for each of the identified data elements and assigning the extracted data value to the corresponding itinerary-specific data elements. For example, a stored value for a flight departure time may be assigned to a "Flight Departure Time" data element. In some embodi-

ments, step **1006** may include obtaining any missing data values from remote server **104** (e.g., by re-synchronizing the itinerary-specific data, by querying remote server **104** for supplemental data, etc.).

**[0211]** Still referring to FIG. **18**, process **1000** is shown to include automatically filling form fields of the webpage with the assigned data values (step **1008**). In some embodiments, step **1008** includes automatically populating form fields with user-specific and/or itinerary-specific data. Step **1008** may include populating form fields according to literal instructions received from remote server **104** or according to independent form-filling logic (e.g., in place of or in addition to the instructions received from remote server **104**). For example, step **1008** may include identifying form fields based on the content of the website data (e.g., metadata, HTML data, etc.) and automatically filling identified form fields with itinerary-specific or user-specific data. Advantageously, step **1008** may allow itinerary-specific data to be provided to a travel website without requiring a user to manually enter the data.

**[0212]** Process **1000** is shown to further include automatically navigating to another webpage (step **1010**). In some implementations, step **1010** is performed by navigation module **208** and/or form-filling module **210**. Step **1010** may include automatically navigating through multiple web pages required for completing a travel-related action. For example, step **1010** may include executing JavaScript® instructions for automatically advancing to another webpage, automatically following hyperlinks within the travel website, and/or automatically submitting itinerary-specific data to the travel provider. In some embodiments, step **1010** is performed when all required data elements (e.g., as identified in step **1002**) are entered into a particular webpage. Advantageously, the combination of steps **1008** and **1010** may facilitate automated form filling and navigation through a travel website (e.g., without requiring user input).

**[0213]** The construction and arrangement of the systems and methods as shown in the various exemplary embodiments are illustrative only. Although only a few embodiments have been described in detail in this disclosure, many modifications are possible (e.g., variations in sizes, dimensions, structures, shapes and proportions of the various elements, values of parameters, mounting arrangements, use of materials, colors, orientations, etc.). For example, the position of elements may be reversed or otherwise varied and the nature or number of discrete elements or positions may be altered or varied. Accordingly, all such modifications are intended to be included within the scope of the present disclosure. The order or sequence of any process or method steps may be varied or re-sequenced according to alternative embodiments. Other substitutions, modifications, changes, and omissions may be made in the design, operating conditions and arrangement of the exemplary embodiments without departing from the scope of the present disclosure.

**[0214]** The present disclosure contemplates methods, systems and program products on any machine-readable media for accomplishing various operations. The embodiments of the present disclosure may be implemented using existing computer processors, or by a special purpose computer processor for an appropriate system, incorporated for this or another purpose, or by a hardwired system. Embodiments within the scope of the present disclosure include program products comprising machine-readable media for carrying or having machine-executable instructions or data structures stored thereon. Such machine-readable media can be any available media that can be accessed by a general purpose or special purpose computer or other machine with a processor. By way of example, such machine-readable media can comprise RAM, ROM, EPROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to carry or store desired program code in the form of machine-executable instructions or data structures and which can be accessed by a general purpose or special purpose computer or other machine with a processor. When information is transferred or provided over a network or another communications connection (either hardwired, wireless, or a combination of hardwired or wireless) to a machine, the machine properly views the connection as a machine-readable medium. Thus, any such connection is properly termed a machine-readable medium. Combinations of the above are also included within the scope of machine-readable media. Machine-executable instructions include, for example, instructions and data which cause a general purpose computer, special purpose computer, or special purpose processing machines to perform a certain function or group of functions.

**[0215]** Although the figures show a specific order of method steps, the order of the steps may differ from what is depicted. Also two or more steps may be performed concurrently or with partial concurrence. Such variation will depend on the software and hardware systems chosen and on designer choice. All such variations are within the scope of the disclosure. Likewise, software implementations could be accomplished with standard programming techniques with rule based logic and other logic to accomplish the various connection steps, processing steps, comparison steps and decision steps.

What is claimed is:

**1**. A system for facilitating interactions between a travel website and a user device, the system comprising:

a user device configured to receive, from a remote server, itinerary-specific data relating to a particular travel itinerary and information for accessing a travel website for performing a travel-related action;

wherein the user device is configured to present the itinerary-specific data in a contextual user interface element on the user device concurrently with a web page of the travel website for performing the travel-related action, wherein the itinerary-specific data are presented as selectable data elements within the contextual user interface element;

wherein the user device is configured to receive a user selection of a selectable data element and to execute instructions for copying the itinerary-specific data from the contextual user interface element to a form field of the travel website in response to the user selection.

**2**. The system of claim **1**, wherein the user device is configured to receive a user input requesting performance of a travel-related action by the user device;

wherein the user device is further configured to send a request for instructions for performing the travel-related action to a remote server, the request including an indication of a particular travel itinerary.

**3**. The system of claim **1**, wherein the user device is configured to receive instructions for presenting the itinerary-specific data in the contextual user interface element from the remote server;

wherein the itinerary-specific data are presented in the contextual user interface element according to the instructions received from the remote server.

**4**. The system of claim **1**, wherein the user device is a mobile device configured to present the webpage of the travel website using a web browser embedded in an application running on the user device;

wherein the application is configured to generate the contextual user interface element and present the contextual user interface element concurrently with the webpage of the travel website.

**5**. The system of claim **4**, wherein the device is a mobile device and the application is a mobile application running on the mobile device.

**6**. The system of claim **1**, wherein the user device is configured to determine which of a plurality of itinerary-specific data elements to present in the contextual user interface element based on content of the web page presented concurrently with the contextual user interface element.

**7**. The system of claim **1**, wherein the user device is configured to:

load a first webpage of the travel website in a web browser running on the user device;

present a subset of the itinerary-specific data in the contextual user interface element concurrently with the first webpage;

navigate from the first webpage of the travel website to a second webpage of the travel website using the web browser;

adjust the subset of itinerary-specific data elements presented in the contextual user interface element in response to navigating from the first webpage to the second webpage; and

present the adjusted subset of itinerary-specific data elements in the contextual user interface element concurrently with the second webpage.

**8**. The system of claim **7**, wherein the user device is further configured to:

select one or more of a plurality of itinerary-specific data elements for inclusion in the subset of itinerary-specific data presented concurrently with the first webpage based on content of the first webpage; and

select one or more of the plurality of itinerary-specific data elements for inclusion in the adjusted subset of itinerary-specific data presented concurrently with the second webpage based on content of the second webpage.

**9**. The system of claim **1**, further comprising:

a remote server configured to generate instructions for presenting the itinerary-specific data in the contextual user interface element and provide the instructions to the user device;

wherein the itinerary-specific data are presented in the contextual user interface element by the user device according to the instructions received from the remote server.

**10**. The system of claim **9**, wherein the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for determining which of a plurality of itinerary-specific data elements to present in the contextual user interface element.

**11**. The system of claim **1**, wherein the instructions are JavaScript® instructions.

**12**. A method for facilitating interactions between a travel website and a user device, the method comprising:

initiating, at a remote server, synchronization of itinerary-specific data and instructions for performing a travel-related action with a user device;

retrieving itinerary-specific data relating to the particular travel itinerary from an itinerary database;

identifying, by the remote server, information for accessing a travel website for performing the travel-related action;

generating, by the remote server, instructions for presenting the itinerary-specific data in a contextual user interface element on the user device, the instructions including instructions for presenting the contextual user interface element concurrently with a webpage of the travel website for performing the travel-related action; and

providing the itinerary-specific data, the information for accessing the travel website, and the instructions for presenting the itinerary-specific data in the contextual user interface element to the user device.

**13**. The method of claim **12**, wherein the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for copying the itinerary-specific data from the contextual user interface element to a form field of the travel website.

**14**. The method of claim **12**, wherein the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for presenting the itinerary-specific data as selectable data elements in the contextual user interface element;

wherein the instructions for presenting the itinerary-specific data in the contextual user interface element further include instructions for copying the itinerary-specific data from the contextual user interface element to a form field of the travel website in response to a user selection of a selectable data element.

**15**. The method of claim **12**, wherein the instructions for presenting the itinerary-specific data in the contextual user interface element on the user device include instructions for determining which of a plurality of itinerary-specific data elements to present in the contextual user interface element.

**16**. The method of claim **15**, wherein the instructions for determining which of the plurality of itinerary-specific data elements to present in the contextual user interface element include logic for determining which of the plurality of itinerary-specific data elements to present in the contextual user interface element based on content of a webpage presented concurrently with the contextual user interface element.

**17**. The method of claim **12**, wherein the instructions are JavaScript® instructions.

**18**. A method for facilitating interactions between a travel website and a user device, the method comprising:

receiving, at a user device, itinerary-specific data relating to a particular travel itinerary, information for accessing a travel website for performing the travel-related action, instructions for presenting the itinerary-specific data in a contextual user interface element;

receiving, via a user interface element of the user device, an input requesting performance of a travel-related action by the user device; and

presenting the itinerary-specific data in a contextual user interface element on the user device, wherein the contextual user interface element is presented concurrently with a webpage of the travel website for performing the travel-related action.

**19**. The method of claim **18**, further comprising:

loading a webpage of the travel website for performing the travel-related action in a web browser running on the user device; and

copying the itinerary-specific data from the contextual user interface element to a form field of the travel website for performing the travel-related action.

**20**. The method of claim **19**, wherein the itinerary-specific data are presented as selectable data elements within the contextual user interface element, the method further comprising:

receiving a user selection of a selectable data element;

wherein the itinerary-specific data are copied from the contextual user interface element to a form field of the travel website in response to the user selection.

**21**. The method of claim **19**, wherein the itinerary-specific data are presented as movable icons within the contextual user interface element, the method further comprising:

receiving a user input moving a movable icon into a space occupied by a form field of the travel website;

wherein the itinerary-specific data are copied from the contextual user interface element to the form field of the travel website in response to the user input.

**22**. The method of claim **18**, wherein the contextual user interface element is presented as a variable-transparency user interface element and the itinerary-specific data are presented as movable icons within the variable-transparency user interface element, the method further comprising:

adjusting a transparency of the contextual user interface element in response to a user input moving a movable icon out of the contextual user interface element.

**23**. The method of claim **18**, further comprising:

determining which of a plurality of itinerary-specific data elements to present in the contextual user interface element based on content of the webpage presented concurrently with the contextual user interface element.

**24**. The method of claim **18**, further comprising:

loading a first webpage of the travel website for performing the travel-related action in a web browser running on the user device;

presenting a subset of the itinerary-specific data in the contextual user interface element concurrently with the first webpage;

navigating from the first webpage of the travel website to a second webpage of the travel website;

adjusting the subset of itinerary-specific data elements presented in the contextual user interface element in response to navigating from the first webpage to the second webpage; and

presenting the adjusted subset of itinerary-specific data elements in the contextual user interface element concurrently with the second webpage.

**25**. The method of claim **24**, further comprising:

selecting one or more of a plurality of itinerary-specific data elements for inclusion in the subset of itinerary-specific data presented concurrently with the first webpage based on content of the first webpage; and

selecting one or more of the plurality of itinerary-specific data elements for inclusion in the adjusted subset of itinerary-specific data presented concurrently with the second webpage based on content of the second webpage.

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