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MANAGING EVENTS BASED ON SPACE AND TIME RELATIONSHIP

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ABSTRACT

A space-aware event management system manages spatially conflicting calendar events. The system analyzes events scheduled on a calendar. The system determines an optimized route between the events based on a spatial and time relationship of the events. Further, the system provides the optimized route to the user.

PROBLEM STATEMENT

Use of electronic calendar applications is increasingly prevalent to help people manage their schedules. When a number of appointments and events are scheduled during a day, it becomes a problem to keep track of them. Many calendar applications help identify when two or more appointments are conflicting from a temporal perspective and provide solutions to reschedule appointments accordingly. However, current calendar applications do not help resolve scheduling conflicts from a spatial perspective. For example, a user may have two events scheduled back to back, but the location of the two events are not in proximity to each other. The user can attend a first scheduled event, but cannot make it in time to a second scheduled event at a different location. As scheduled, there is not enough time between the two events for the user to travel from the first event to the second event. A system that provides a mechanism to manage spatially conflicting calendar events is described.

SPATIAL EVENT MANAGEMENT SYSTEM

The systems and techniques described in this disclosure relate to a spatial event management system. The system can be implemented for use in an Internet, an intranet, or another client and server environment. The system can be implemented as program instructions locally on a client device or implemented across a client device and server environment. The client device can be any electronic device such as a mobile device, a smartphone, a tablet, a handheld electronic device, a wearable device etc.

Fig. 1 illustrates an example method 100 for managing events and appointments. The method can be performed by a system that manages calendar events, for example, the space-aware event management system. The system analyzes events scheduled on a calendar (Block 102). The system can analyze the scheduled events on the calendar to determine time and location for each scheduled events. For example, the system analyzes an event "dinner with friend" to determine it is scheduled at 9 PM at Sam's Cafe, and another event "meeting with a client" to determine it is scheduled at 5 PM at Times Square.

The system determines an optimized route between the events based on a spatial and time relationship of the events (Block 104). To determine an optimized route, the system can check if any of the scheduled events conflict in time or space. To check for spatial conflicts, the system can determine if it is possible to travel between the respective locations of the scheduled events and arrive at the scheduled events at their scheduled times. The system may analyze the distance between the locations where the one or more events are scheduled. From the distance, the system may also identify a driving duration needed to cover the distance to determine if it is possible to attend the respective events. Alternatively, or additionally, the system may also check available flights from one location to another location to determine travel time between different event locations. For example, if a user has one event scheduled at 8:00 am in London and another event scheduled at 9:00 am in Oxford, the system can analyze the spatial and time relationship between the events and determine that only one of the two events can be attended by the user. In yet another example, if a user has a total of 3 events scheduled in his calendar for a day, a first event scheduled at 8:00 am in London, a second event scheduled at 9:00 am in Oxford, and a third event scheduled at 2:00 PM in London, the system can analyze the spatial and time relationship between the events and determine that either the user can attend the two events scheduled in London or the one event scheduled in Oxford. The system may also consider current user location for determining an optimized route. The system can also determine multiple optimized routes covering multiple scheduled events.

The system can consider various factors such as present location of the user, ranking associated with the events, time/spatial flexibility of the events, etc. to determine an optimized route. The system can determine the optimized route in a way that makes it possible to attend the maximum number of scheduled events. Alternatively, or additionally, the user can have an associated ranking for each of the events based on his preference. While determining an optimized route, the system may determine the optimized route based on the user's associated rankings for the events. For example, if the events scheduled in the user's calendar are : a) visit Tim's new apartment in London at 7:30 PM (rank: 3), b) dinner in Oxford at 8:00 PM (rank: 8), c) Watch movie in London at 8:30 PM (rank: 4), the system can determine two optimized routes- a first route that excludes all the events in London as the commulative score of the event ranks in London (3+4=7) is less than that of the dinner in Oxford (8) and a second route that excludes the dinner to maximize the number of attendable events. Herein, while the first route is based on the commulative ranking, the second route targets covering maximum number of scheduled events. Accordingly, the system can suggest one or more optimized routes.

Additionally, or alternatively, the system may determine optimized routes based on spatial and temporal flexibility of the scheduled events. For example, a scheduled event “buy a bottle of wine before dinner” is flexible in space but not in time, i.e., the bottle can be bought from any wine store situated at any location but it has to be bought before dinner. For events which are flexible in space, the system can determine an optimized route where the system slots the flexible event between, before, or after other events. In yet another example, an event “Watch a new movie at XYZ cinema with Fred” is flexible in time, but not in space. For such events, the system can identify an appropriate time in light of the other scheduled events, and optimize a route accordingly. Further, for the events which are flexible in time, the system can determine when a user has an open time slot and can comfortably attend the event. The system can accordingly provide an optimized route by scheduling the event at the open time slot. The system can schedule the event at a time when the user is close to the location associated with the event.

Further, the system provides the optimized route to the user (Block 106). If the system determined multiple routes, all the determined routes can be provided to the user. Alternatively, one or more routes of the determined multiple routes can be present to the user. For example, the system can provide routes that cover the maximum number of events and/or routes that cover the event with the greatest ranking along with other possible events. The system may provide the user with the optimized route either in a calendar view format or a map view format.

Fig. 2 illustrates an example graphical user interface (GUI) 200 for a calendar view associated with the space-aware event management system. In Fig. 2, the GUI 200 displays events 202, 204, 206, 208. A dotted-box for event 208 indicates that the event was either flexible in time or space. Events 202, 206, and 208 are bundled as part of route 1 and event 204 indicates route 2. Events 202, 206, and 208 are bundled as part of route 1 because they do not conflict with each other in space or time. Event 204 is part of route 2 because event 204 is scheduled in New York and conflicts in space with other events 202, 206 which are scheduled in Los Angeles. It may not be possible to attend events 202 and 204 together and as part of a single route, thus, event 204 is in a separate route, i.e., route 2. Grayed-out arrows 210 indicate route 1. Particularly, arrows 210 indicate the order in which the user can attend events associated with route 1. Non-greyed out arrow 212 indicates route 2. Events of route 1 and route 2 are visually differentiated by color (greyed-out and non-greyed out boxes) so that the user can easily differentiate between events associated with different route options. The system can provide the user with options for making different routes appear visually different in terms of color, shape, and any other visual characteristic. If the user selects any one of the provided two routes, the other routes can be removed from the calendar GUI 200 or made opaque in the GUI.

Similarly, in a map view, the system can display travel paths for for the different route options on a mapping application. Additionally, the system can display a timeline on the mapping application describing the different route options. The user can view the time and travel paths associated with various events on the mapping application. By scrolling along the timeline, the user can also view events attended in the past and events scheduled in the future on the mapping application.

FIG. 3 is a block diagram of an exemplary environment that shows components of a system for implementing the techniques described in this disclosure. The environment includes client devices 310, servers 330, and network 340. Network 340 connects client devices 310 to servers 330. Client device 310 is an electronic device. Client device 310 may be capable of requesting and receiving data/communications over network 340. Example client devices 310 are personal computers (e.g., laptops), mobile communication devices, (e.g. smartphones, tablet computing devices), set-top boxes, game-consoles, embedded systems, and other devices 310' that can send and receive data/communications over network 340. Client device 310 may execute an application, such as a web browser 312 or 314 or a native application 316. Web applications 313 and 315 may be displayed via a web browser 312 or 314. Server 330 may be a web server capable of sending, receiving and storing web pages 332. Web page(s) 332 may be stored on or accessible via server 330. Web page(s) 332 may be associated with web application 313 or 315 and accessed using a web browser, e.g., 312. When accessed, webpage(s) 332 may be transmitted and displayed on a client device, e.g., 310 or 310'. Resources 318 and 318' are resources available to the client device 310 and/or applications thereon, or server(s) 330 and/or web pages(s) accessible therefrom, respectively. Resources 318' may be, for example, memory or storage resources; a text, image, video, audio, JavaScript, CSS, or other file or object; or other relevant resources. Network 340 may be any network or combination of networks that can carry data communication.

The subject matter described in this disclosure can be implemented in software and/or hardware (for example, computers, circuits, or processors). The subject matter can be implemented on a single device or across multiple devices (for example, a client device and a server device). Devices implementing the subject matter can be connected through a wired and/or wireless network. Such devices can receive inputs from a user (for example, from a mouse, keyboard, or touchscreen) and produce an output to a user (for example, through a display). Specific examples disclosed are provided for illustrative purposes and do not limit the scope of the disclosure.

DRAWINGS

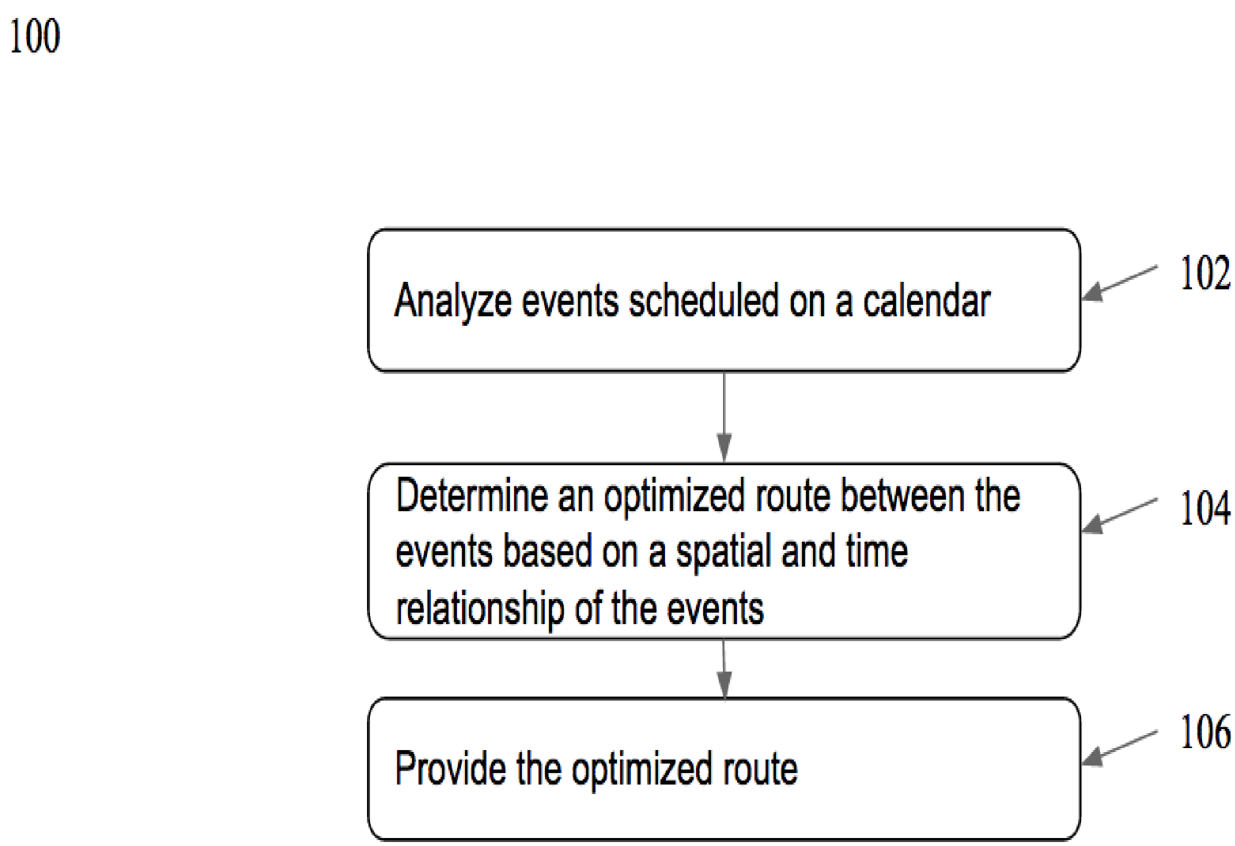

Fig. 1

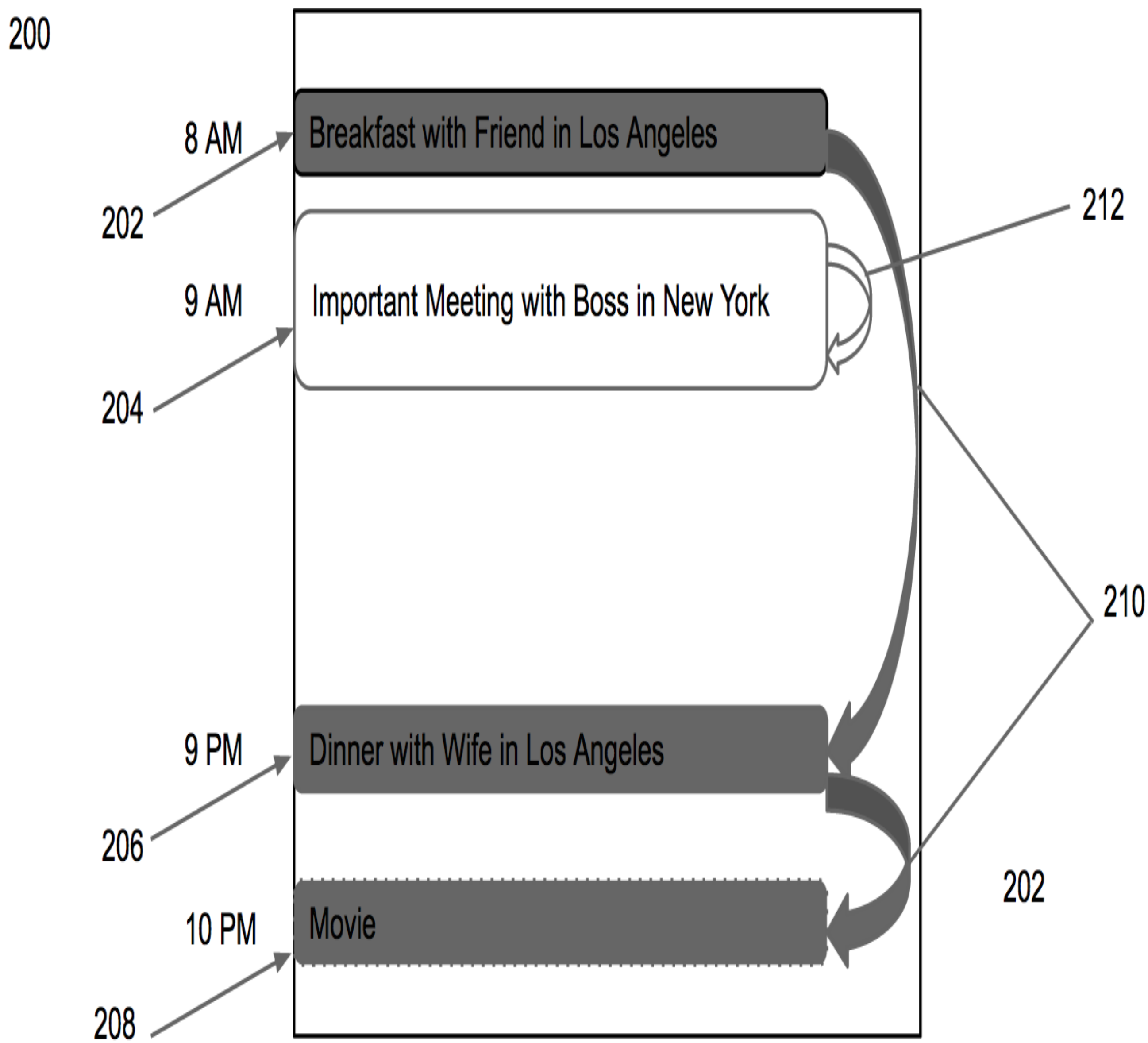
200
8 AM
Breakfast with Friend in Los Angeles
202
212
9 AM
Important Meeting with Boss in New York
204
210
9 PM
Dinner with Wife in Los Angeles
206
202
10 PM
Movie
208

Fig. 2

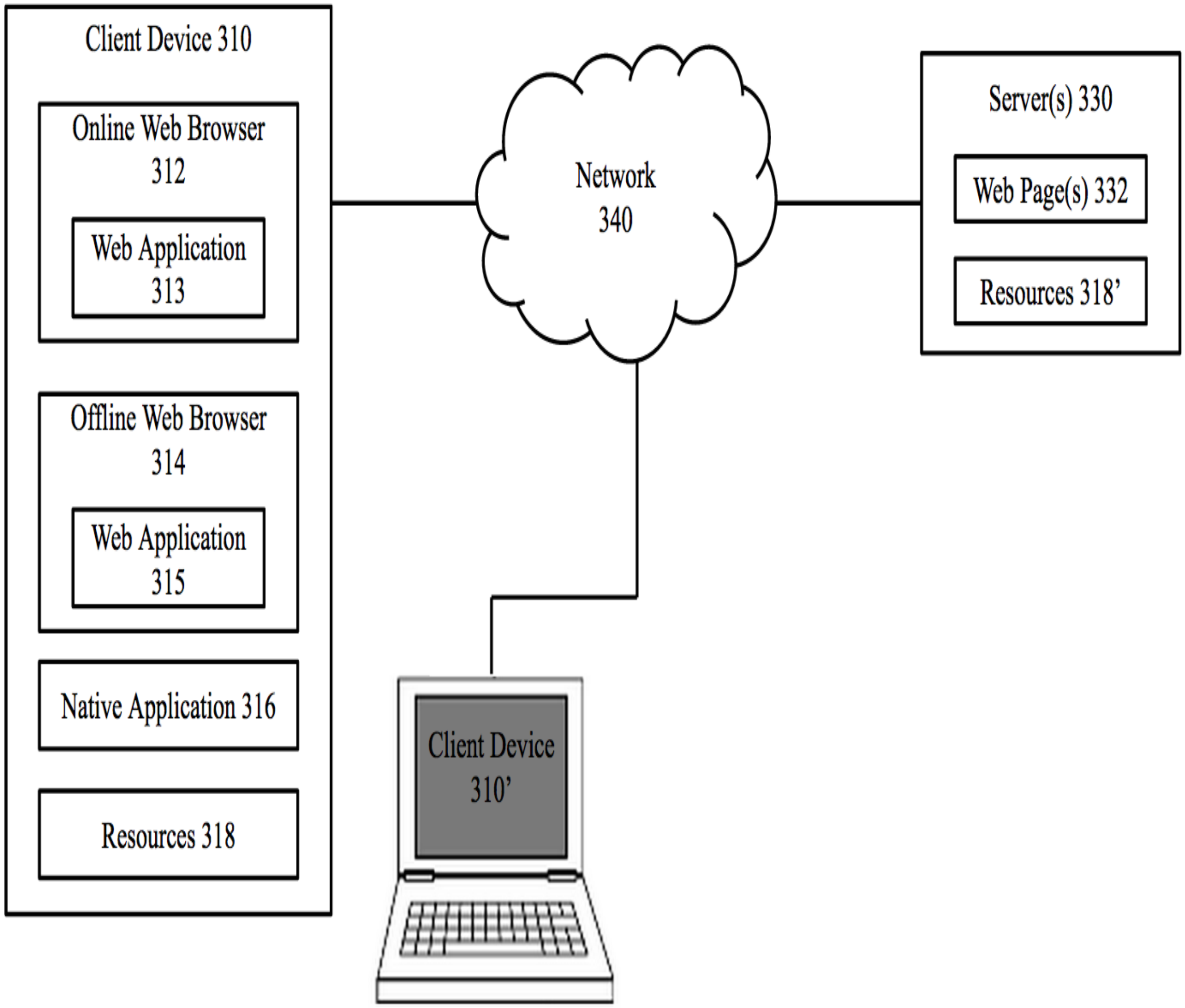
Client Device 310
Online Web Browser 312
Web Application 313
Offline Web Browser 314
Web Application 315
Native Application 316
Resources 318
Network 340
Server(s) 330
Web Page(s) 332
Resources 318'
Client Device 310'

Fig. 3