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- (54) **Title:** INCLUDING TRIP PLAN DATA IN AN ELECTRONIC CALENDAR

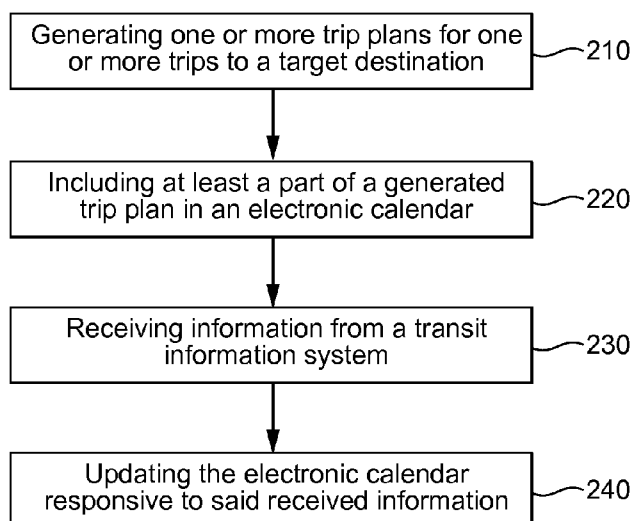


FIG. 2

(57) **Abstract:** A computer-implemented method comprises generating one or more trip plans for one or more trips to a target destination. Each trip plan includes instructions to reach the target destination. The instructions comprise one or more steps and time data associated with one or more of said steps. The method comprises including at least part of a said generated trip plan in an electronic calendar, wherein the electronic calendar is configured for storing calendar entries including time data for each calendar entry. Including at least a part of a generated trip plan in said electronic calendar comprises creating one or more calendar entries, each calendar entry including one or more steps of the trip plan, wherein time data for said one or more calendar entries corresponds to time data associated with one or more steps of the trip plan.

Including trip plan data in an electronic calendar

Field

This invention relates to including trip plan data in an electronic calendar, in particular,
5 but not exclusively, so that alerts regarding the trip may be provided to a user's mobile device.

Background

Online trip planning systems have been developed which allow travellers to plan a
10 route from a start location to a target destination using public transportation, taking into account a selected start time or arrival time for the journey.

The trip plan data generated by a trip planning system may include a walking leg from a start location to an initial public transport station or stop (stations and stops
15 hereinafter collectively called "stations"). The trip plan data may also include one or more transit legs via public transport to a final public transport station, and a further walking leg from the final public transport station to the target destination. The journey may involve the use of more than one transport route, for example different train lines, bus routes or ferries and may involve one or more transfers from one vehicle
20 to another, which may involve walking to accomplish a transfer.

An example of a trip planning service is Google Transit, available online at

<http://www.google.com/intl/en/landing/transit/#mdy>

25 Users of trip planning systems often get transit information several hours before they leave their start location. This means they either have to remember or write down the results of the trip planning query, or re-issue the query later. Furthermore, online trip planning services are not available offline. As a result, users who don't want to pay expensive roaming fees are not able to find details for a transit trip when they need it
30 the most: in a foreign country without a car.

Summary

In embodiments of the invention described herein, at least part of a generated trip plan is included in one or more calendar entries stored in a user's electronic calendar.

In embodiments, one or more calendar entries are created, each calendar entry including one or more steps of the trip plan. Time data for said one or more of the calendar entries corresponds to time data associated with one or more steps of the trip plan.

5

In embodiments, the calendar provides one or more alerts to remind the user when a step of the trip plan should be carried out.

In embodiments, one or more of the calendar entries created for said trip plan are updated responsive to “real time” transit information received from one or more transit information systems.

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Brief description of the drawings

In order that the invention may be more fully understood, embodiments thereof will now be described by way of illustrative example with reference to the accompanying drawings, in which:

15

Figure 1 is a schematic block diagram of system configured in accordance with an exemplary implementation;

20

Figure 2 is a flow diagram illustrating a computer-implemented method in accordance with an exemplary implementation;

Figure 3 illustrates an exemplary content page displayed by a user client during a communication session.

25

Detailed Description

Overview

Systems according to embodiments of the present invention are operable to generate one or more public transportation trip plans in response to a user request, and to include generated trip plan data in the user's electronic calendar. The calendar may be stored online and synchronised with the user's mobile device, so as to provide the user with offline access to the stored trip plan. The user may be provided with alerts regarding the trip via the calendar system. For example, an alert may be provided to remind the user 3 minutes before it is time to leave the start location and/or 3 minutes before the user should get off a train or other public transport mode. In addition, one or more alerts including trip information may be provided to the user during the trip.

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For example, the user may be provided with an alert including information on a train to take and the platform to go to when the user arrives at a station.

5 Systems according to embodiments of the present invention receive real-time transit information relating to the expected arrival/departure times of trains, buses or other public transport from one or more transit information systems of one or more transit providers. If the received information indicates that details of a trip plan stored in a user's calendar have changed, the stored trip plan is updated. For example, if a train is delayed, the system automatically updates the user's calendar. If the delay has
10 consequences for a trip (e.g. if the user would miss a transfer), the system may automatically update the user's calendar with a new trip plan.

System Architecture

Figure 1 is a schematic block diagram of a system configured in accordance with an
15 embodiment of the present invention. The system includes a client 1, which communicates with a trip planning system 2 over a network 3. The trip planning system 2 includes a trip planning module 4 configured to receive a user request and in response to generate a number of different trip plan suggestions, each of which include instructions to reach a user-selected target destination. The trip planning system 2
20 includes a trip diarising module 5, which is configured to interact with a calendar system 6 to include a user-selected trip plan in the user's electronic calendar 7.

As shown in Figure 1, the trip planning system 2 receives real-time transit information data 8 provided by one or more transit information systems (not shown) of one or more
25 public transport providers. The trip planning system 2 has a calendar update module 9, which identifies from received transit information whether a trip plan stored in a user's calendar should be updated, and causes the stored trip plan to be updated if necessary.

Although Figure 1 for simplicity illustrates operation of the system in relation to a
30 single user client, the skilled reader will appreciate that many other clients 1 may also be in communication with the trip planning system 2 via the network 3. Thus, the system of Figure 1 can cater for requests from many different users, who may request trip planning queries and may choose to add the query results to their respective electronic calendars stored in calendar system 6 as described herein.

Each client 1 may be any type of device which is configured for computing, such as a smartphone or other mobile communications device, a personal computer, laptop, a PDA, a navigation system located in a vehicle, a handheld GPS system, and so on.

5 In embodiments, the client 1 includes a browser (or other similar application) that allows the user to interface and communicate with the trip planning system 2 and calendar system 6 via one or more web serving systems (not shown). Web serving systems and the interaction between web serving system and browser is well known *per se* to those skilled in the art and will not be described in detail here. Briefly, a web
10 serving system delivers content such as HTML (hypertext markup language), images, scripting language (e.g: JavaScript, Jscript, Visual Basic Script) and other elements that can be used by the browser on the client 1. A web serving system may include one or more servers operating under a load balancing scheme, with each server (or combination of servers) configured to respond to and interact with the client 1.

15 The network 3 may comprise any suitable network such as the Internet or other WAN, a wireless telecommunications network or LAN, which may be wired or wireless, or a local area network (e.g: intranet), or a combination of networks.

20 The components of the overall system of Figure 1 (e.g: trip planning system 2 and calendar system 6) may each comprise a single server or a plurality of servers which operate together. As shown, the systems 2, 6 include a number of processing modules. It will be appreciated that the term “module” refers to computer logic utilised to provide specified functionality. Thus, a module can be implemented in hardware,
25 firmware and/or software controlling a processor. In one embodiment, the modules are program files stored on a storage device, loaded into memory and executed by a processor, or can be provided from computer program products, for example computer executable instructions, that are stored in a tangible computer-readable storage medium such as RAM, hard disk, or optical or magnetic media. It will be appreciated
30 that embodiments of the directions system can have different or other modules to the ones described herein, with the described functionalities distributed amongst the modules in a different manner.

Figure 2 illustrates process steps in an exemplary interaction involving the client 1, the
35 trip planning system 2 and the calendar system 6. As shown, trip planning module 4 generates 210 one or more trip plans for one or more trips to a target destination. Trip

diarising module 5 causes a generated trip plan to be transmitted to the calendar system 6 and to be included 220 in an electronic calendar of calendar system 6. Trip planning system 2 receives 230 transit information from the transit information system 8, which is monitored by the calendar update module 9 to determine whether a trip
5 plan which has been stored in a user's calendar should be updated. If the information received from the transit information system indicates that details of a previously stored trip plan should be changed, the calendar update module causes the trip plan to be updated accordingly. That is, the calendar update module causes a trip plan included in the electronic calendar to be updated responsive to the received
10 information, as shown in step 240.

Calendar system

The calendar system 6 of Figure 1 comprises a time-management web application, e.g: Google Calendar or other online calendar system.

15

The calendar system 6 stores calendar data in the form of calendar events, each event including time data for the event (e.g: start time/date, end time/date) and description data for the event. The description data may include the name of the event and a location for the event. In embodiments, some calendar events may also include an
20 image for the event, e.g: a photograph or map showing a location for the event and/or other content.

The system 6 may be configured to synchronise a user's electronic calendar with a local calendar application running locally on the client 1 and/or other device(s) of the user, using synchronisation techniques which are well known to those skilled in the art. The
25 calendar system 6 and/or the local calendar may be configured to provide alerts in the form of reminders to the user by email, SMS, or to cause alerts to appear on the display of a device of the user, e.g: via push notifications. Alerts may be provided in advance of or at the time of calendar events stored in the electronic calendar, and may include
30 some or all of the data stored for the calendar event.

Although the calendar system may comprise an online calendar system which synchronises with a local calendar as described above, in alternative embodiments the calendar system may comprise a calendar application running locally on the client 1, or
35 on another device of the user.

It will be appreciated that the calendar system 6 may comprise a proprietary electronic calendar such as Mozilla Sunbird, Windows Live Calendar, Google Calendar or Microsoft Outlook, or alternatively may comprise one or more bespoke modules configured for time/date functionality.

5

Trip planning system

The trip planning module 4 of trip planning system 2 generates one or more trip plans in response to a user query, each trip plan comprising step-by-step instructions for a route from a start location to a target destination by way of public transportation. The user query specifies the target destination and also a time/date that the user wishes to arrive or leave. The start location for the trip plan may also be specified by the user, or may alternatively be obtained based on location information for the user provided by GPS and/or other location detection schemes.

15 The instructions generated by the trip planning module 4 comprise navigation directions from the start location to the target destination and may be referred to as “transit directions”. The trip planning module 4 causes the generated transit directions to be displayed to the user at the client 1.

20 Those skilled in the art will appreciate that the trip planning module 4 may be implemented using known technology. For example, in some implementations, the trip planning module 4 may include modules as described in US patent application publication no.: US2011/0112759, filed 1 April 2010 with title “Transit Routing System for Public Transportation Trip Planning”. The trip planning module 4 may generate a number of different trip plan suggestions in response to a particular user query, for example using techniques described in US2011/0112759.

Each trip plan generated by the trip planning module 4 may comprise one or more trip legs, each leg comprising one or more steps. For example, a trip plan may include a walking leg from a start location to an initial public transport station, a transit leg from the initial public transport station to a final public transport station, and a further walking leg from the final public transport station to the target destination.

35 The transit leg may include one or more transit stages, each transit stage including a number of transit direction steps. The transit direction steps may include a step of boarding a train (or other transport mode) at a boarding time, and a step of getting off

the train (or other transport mode) at an arrival time. The transit leg may further comprise one or more transfer steps from one transit stage to another, which may involve walking to accomplish the transfer.

- 5 In embodiments, the transit leg also includes further information relating to the user's journey via public transportation. For example, the transit leg may include information relating to the stops that the user will pass, the number of stops, and/or information about the vehicle or vehicles involved with the transit leg (e.g: wi-fi, food, coffee, smoking/non-smoking, first class, relevant URLs).

10

In embodiments, the walking leg from the start location to the initial public transport station comprises a time to start the journey, and, optionally, directions steps to the station. Similarly, the walking leg from the final public transport station to the target destination may include an arrival time, and a number of directions steps.

15

The trip diarising module 5 of trip planning system 2 is configured to cause data generated by the trip planning module 4 to be sent from the trip planning system 2 to the calendar system 6 and to be included in the user's electronic calendar.

- 20 The calendar update module 9 receives data feeds 8 provided by one or more transit providers, e.g: for example relating to live expected departure times for trains, buses or other public transportation. Such "real time" data feeds are well known *per se* to those skilled in the art, and are currently available from a number of different public transport providers. The calendar update module 9 monitors the incoming real-time data and determines whether trip data which has been included in a user's calendar
25 needs to be updated, e.g: in view of delays and other changes to expected arrival/departure times. If a delay has consequences for a trip (e.g: if the user would miss a transfer), the calendar update module 9 may instruct the trip planning module 4 to generate a completely new trip plan to replace the trip plan stored in the user's calendar. The calendar update module 9 then updates the user's calendar accordingly.
30

- For the purpose of updating the user's calendar responsive to received transit information, the trip planning system 2 may include a local trip plan database 10 to store a record of active trip plans which are included in one or more electronic
35 calendars of one or more users. The calendar update module 9 may compare incoming real-time data with the active trip plans stored in the local trip plan database 10 to

determine when an update to a diarised trip plan is required. If an update is required, the calendar update module 9 causes the relevant calendar to be updated accordingly. The trip planning system 2 is configured so that users may opt out of data collection in the trip plan database 10 if they wish.

5

Generating trip plan suggestions - example

Figure 3 illustrates an exemplary content page delivered by the trip planning system 2 and displayed by the client 1 during a communication session. As shown, the page includes a text field 310 in which the user can enter a start location and a text field 320
10 in which the user can enter a target destination. The page also provides a drop down box 330 and a field 340 whereby the user can select the time that they would like to leave the start destination or arrive at the target destination. A field (not shown) to enter a date may also be provided.

15 In the example of Figure 3, the user fills out the text fields 310, 320 to request transit directions from Bahnhofstrasse 79, Zürich, Switzerland to Hafnerstrasse 9, Zürich, Switzerland. The user uses the drop down box 330 and the field 340 to indicate that they would like to leave at 21:43.

20 The user query is sent from the client 1 to the trip planning system 2. In response to the user query, the trip planning module 4 generates 210 three trip plan suggestions 350, 360, 370.

As shown, the first trip plan suggestion 350 includes a walking leg from the start
25 location to an initial public transport station, Zürich Bahnhofstrasse/HB. The walking leg includes the step 352 "Walk to Zürich Bahnhofstrasse/HB" at a start time of 21:46.

The trip plan 350 also includes a transit leg from the initial public transport station to a final public transport station, Zürich, Sihlquai/HB. The transit leg includes the step
30 354 of taking Tram 13 towards Zürich at 21:48. This step also includes information relating to the number of stops the user will pass during the tram journey. In some implementations, information relating to the names of the stops may also be provided.

As shown, the trip plan 350 also includes a step 356 of getting off the Tram at 21:53.

35

As shown, the other trip plan suggestions 360, 370 provide alternative options for travelling to the start location to the target destination via public transport, e.g: leaving at a different time and/or taking a different tram.

5 Those skilled in the art will appreciate that the trip plans of Figure 3 are exemplary and that many variations are possible. For example, the transit leg may include a plurality of transit stages, each comprising one or more steps. In some cases the transit leg may also include one or more transfer steps from one transit stage to another, as described above.

10

As is described in more detail below, the layout of the trip steps shown in Figure 3 gives a preview of the calendar events which will be added to the user's calendar for each trip plan. Thus, it may not be necessary for all of the trip plan data generated by the trip planning module 4 in response to a query to be displayed the user. For example, the
15 trip plan 350 generated by the trip planning module 4 also includes a walking step to the target destination, although this is not displayed to the user in the example of Figure 3.

The skilled reader will also appreciate that time data generated for a step of a trip plan
20 may also include date information for that step, and that in some cases, different steps could occur on different dates.

Including trip plans in a user's calendar - example

As shown in Figure 3, the user is provided with the option to select one of the generated
25 trip plan suggestions 350, 360, 370 for inclusion in his/her electronic calendar, by selecting the "add this trip to calendar" button 382, 384, 386 for the chosen trip plan. When the user selects a trip plan in this way, the selected trip plan is added to the user's calendar.

30 In order to identify the user and his/her calendar, the user may be asked to provide login details prior to generation of the trip plan suggestions 350, 360, 370, or alternatively, after selecting "add this trip to calendar". The calendar system 6 is configured to provide users with the option to either permit or prevent the trip planning system from adding data to the user's calendar.

35

According to embodiments of the invention, including a trip plan in a user's calendar comprises creating a plurality of calendar events in the user's calendar, each calendar event including one or more steps of the trip plan.

5 For example, if the user opts to add the trip plan 350 in his calendar by selecting the appropriate button 380, the trip diarising module 5 causes three events to be created in the user's calendar corresponding to the walking step 352, the transit step 354 and the "get off now" step 356 respectively. Thus, the layout of the trip steps shown in Figure 3 gives a preview of the calendar events which will be added to the user's calendar.

10

The first calendar event, corresponding to the walking step 352, is created at the start time of the walking step 352, ie at 21:46. The second calendar event, corresponding to transit step 352, is created at the time that the tram departs, ie: at 21:48. The third calendar event, corresponding to the "get off now" step 356, is created at the time that
15 the user should leave the train, ie: at 21:53. It will be appreciated that the time data for each calendar event may also include date data for the corresponding step.

In embodiments, the trip diarising module 5 includes information relating to trip steps in corresponding calendar events. For example, walking directions on how to get to the
20 initial public transport station may be included in the first calendar event (ie: in the event corresponding to the walking step). The trip diarising module 5 also includes information in the second calendar event (ie: the event corresponding to the transit step), for example the names of the stops that the user is going to pass, information on how many stops, and information about the vehicle the user is on (wi-fi, food, coffee,
25 smoking, first class, relevant URLs). Walking directions on how to get to the final public transport station may be included in the third calendar event (ie: in the event corresponding to the "get off now" step 356).

In embodiments, the trip diarising module may query the local trip plan database to
30 determine whether other associated users (e.g: friends) have planned a trip which overlaps with the user's planned trip. The names of any such identified users may be included in the calendar events created for the corresponding trip steps. Thus, for example, transit steps may include the names of friends who are on the same tram or train.

35

The user's calendar may be synchronised with a local calendar application running locally on the client 1 and/or other device(s) of the user using synchronisation techniques which are well known to those skilled in the art. Thus, the calendar events created for the trip plan may be pushed to the user's device(s) and thus made available
5 to the user offline.

Setting up alerts - example

The trip diarising module 5 is configured to set up alerts for some or all of the calendar events created for the selected trip plan. For example, an alert may be set up for the
10 first calendar event such that the user receives an alert three minutes before it is time to leave the start location. An alert may be set up for the third calendar event so that the user receives an alert 3 minutes before the user should get off the tram.

The alerts may include data stored in the corresponding calendar event. For example,
15 the alert which reminds the user to leave the start location may include directions to the initial public transport station. The alert which reminds the user to get off the tram may include directions from the final public transport station to the target destination.

The calendar system 6 may cause the alerts to be provided by email, SMS, or to appear
20 on the display of a device of the user, e.g: by way of a calendar pop-up. As shown in Figure 3, in embodiments a selector 390 may be provided to allow the user to select whether to receive the alerts by text message, calendar pop-up, or whether to opt out of alerts.

If enabled by the user, the trip planning system may receive location data for the user's
25 device from a location tracking service, and provide the user with alerts based on his or her location. In this way, for example, an alert may be provided when the user arrives at the initial public transport station. This alert may include data stored in the second calendar event (ie: data relating to the public transit leg of the trip). For example, the
30 alert may include information such as the tram or platform to find.

As will be understood from the foregoing, in embodiments of the present invention some or all of the results of a transit query are included in one or more calendar events created in a user's electronic calendar. Each such calendar event may relate to a single
35 step of a trip plan, or to more than one step of the trip plan. In embodiments, calendar events may be created for certain steps or legs of the trip plan according to

predetermined rules for creating calendar events, stored for example at trip planning system 2. These rules may prescribe that calendar events are created for certain steps or legs, and optionally not for others, and that certain information is included in calendar events, e.g: in accordance with the examples described above. In some
5 implementations, rules may prescribe that a calendar event is created for an initial walking step, for each of one or more transit steps, and for the “get off now” step. Alternatively, rather than creating a calendar event for each transit step, a single calendar event could be created for the transit leg, including all transit steps. Instead of creating a calendar event for the “get off now” step, rules may prescribe that a calendar
10 event is created for a walking step from the final public transport station to the target destination, and that walking directions are included in this step. Many other variations are possible.

The stored rules for creating calendar events may also include rules for setting up alerts
15 relating to the calendar events. For example, the alerts may prescribe that an alert should be provided a predetermined time (e.g: 3 minutes) before the first leg of a trip plan starts and/or that an alert should be provided at a predetermined time (e.g: 3 minutes) before the user should get off a train, tram or other public transportation mode.

20 More generally, those skilled in the art cognizant of the present disclosure will appreciate that the rules for creating calendar events may be chosen such that helpful reminders are provided to the user at appropriate times before and during the planned trip.

25 *Calendar update based on real-time data*

As described above, calendar update module 9 compares real-time transit information provided by transit providers with a record of diarised trip plans stored in local trip plan database 10 to determine if an update to a diarised trip plan is required. For
30 example, if received transit information indicates that a train, tram or other public transport vehicle is delayed and that this delay affects a diarised trip plan, one or more of the corresponding calendar events for the trip plan may be updated to reflect the change.

35 For example, in relation to the trip plan suggestion 350, if the calendar update module 9 receives transit information indicating that tram 13 scheduled to arrive at 21:48 has

been delayed until 21:53, time data for the calendar event created for the corresponding transit step 352 is updated to reflect the new expected tram arrival time.

5 The calendar update module 9 may be configured to determine if a delay has consequences for the trip (e.g: if the user would miss a transfer). In this case, the calendar update module 9 may cause the trip planning module 4 to generate a new trip plan to replace the trip plan stored in the user's calendar, and may cause the calendar update module 9 to update the user's calendar accordingly.

10 If enabled by the user, the calendar update module 9 may receive location data for the user's device from a location tracking service (e.g: Google latitude) and may update the trip plan stored in a user's calendar based on the location information. For example, if the location tracking service indicates that the user is not at a station at the time that a diarised train journey is scheduled to start, calendar update module 9 may cause the
15 trip planning module to generate a new trip plan from the user's location and update the user's calendar accordingly.

Many variations of the examples described above are possible.

20 For example, although the layout of the trip steps shown in Figure 3 gives a preview of the calendar events which will be added to the user's calendar with some steps of the trip plan (e.g: final walking step) omitted, alternatively, the trip planning system may include the entire results of a trip planning query to the user, with the option to add the trip to the calendar.

25 Moreover, although communication with the client via a web server is discussed above, in some examples the client may include an application (e.g: a mobile app) configured to communicate with the trip planning system via an application programming interface (API). It will be appreciated that an API may also be employed in web-based
30 implementations as well as in app-based implementations.

Furthermore, although Figure 1 shows a client 1 in communication with a trip planning system 2, alternatively some or all of the functionality of the trip planning system and/or electronic calendar could be carried out at the client. For example, the client
35 may comprise a mobile device which includes an application configured to generate one or more trips plans for one or more trips to a target destination and/or to cause a

generated trip plan to be included in the user's electronic calendar or on a local calendar running on the mobile device. In embodiments, the application may be configured to provide reminders to the user via push technology or alerts triggered by background processes.

5

Many modifications and variations of the embodiments of the invention described herein are possible within the scope of the claims hereinafter.

Furthermore the particular naming of the components, capitalization of terms, the attributes, data structures, or any other programming or structural aspect is not
10 mandatory or significant, and the mechanisms that implement the invention or its features may have different names, formats, or protocols. Further, the system may be implemented via a combination of hardware and software, as described, or entirely in hardware elements. Also, the particular division of functionality between the various
15 system components described herein is merely exemplary, and not mandatory; functions performed by a single system component may instead be performed by multiple components, and functions performed by multiple components may instead performed by a single component.

20 Some portions of above description present the features of the present invention in terms of algorithms and symbolic representations of operations on information. These algorithmic descriptions and representations are the means used by those skilled in the data processing arts to most effectively convey the substance of their work to others skilled in the art. These operations, while described functionally or logically, are
25 understood to be implemented by computer programs. Furthermore, the reference to these arrangements of operations in terms of modules should not be considered to imply a structural limitation and references to functional names is by way of illustration and does not infer a loss of generality.

30 Unless specifically stated otherwise as apparent from the description above, it is appreciated that throughout the description, discussions utilising terms such as "processing" or "computing" or "calculating" or "determining" or "displaying" or the like, refer to the action and processes of a computer system, or similar electronic computing device, that manipulates and transforms data represented as physical

(electronic) quantities within the computer system memories or registers or other such information storage, transmission or display devices.

Certain aspects of the present invention include process steps and instructions
5 described herein in the form of an algorithm. It should be understood that the process steps, instructions, of the present invention as described and claimed, are executed by computer hardware operating under program control, and not mental steps performed by a human. Similarly, all of the types of data described and claimed are stored in a computer readable storage medium operated by a computer system, and are not simply
10 disembodied abstract ideas.

The present invention also relates to an apparatus for performing the operations herein. This apparatus may be specially constructed for the required purposes, or it may comprise a general-purpose computer selectively activated or reconfigured by a
15 computer program stored on a computer readable medium that can be executed by the computer. Such a computer program are stored in a computer readable storage medium, such as, but is not limited to, any type of disk including floppy disks, optical disks, CD-ROMs, magnetic-optical disks, read-only memories (ROMs), random access memories (RAMs), EPROMs, EEPROMs, magnetic or optical cards, application specific
20 integrated circuits (ASICs), or any type of media suitable for storing electronic instructions, and each coupled to a computer system bus. Furthermore, the computers referred to in the specification may include a single processor or may be architectures employing multiple processor designs for increased computing capability.

25 The algorithms and operations presented herein can be executed by any type or brand computer or other apparatus. Various general-purpose systems may also be used with programs in accordance with the teachings herein, or it may prove convenient to construct more specialized apparatus to perform the required method steps. The required structure for a variety of these systems will be apparent to those of skill in the
30 art, along with equivalent variations. In addition, the present invention is not described with reference to any particular programming language. It is appreciated that a variety of programming languages may be used to implement the teachings of the present invention as described herein.

Claims

1. A computer-implemented method, comprising:
generating one or more trip plans for one or more trips to a target destination,
5 each trip plan including instructions to reach the target destination, the instructions
comprising one or more steps and time data associated with one or more of said steps;
and
including at least part of a said generated trip plan in an electronic calendar,
wherein the electronic calendar is configured for storing calendar entries including time
10 data for each said calendar entry,
wherein including at least a part of a generated trip plan in said electronic
calendar comprises creating one or more calendar entries, each calendar entry
including one or more steps of the trip plan, wherein time data for said one or more
calendar entries corresponds to time data associated with one or more steps of the trip
15 plan.
2. A computer-implemented method as claimed in claim 1, wherein each trip plan
includes instructions to reach the target destination using public transportation.
- 20 3. A computer-implemented method as claimed in claim 1, further comprising
providing an alert at or in advance of the time corresponding to a calendar entry so as
to provide a reminder of the time that a step of the trip plan should be carried out.
4. A computer-implemented method as claimed in claim 1, further comprising
25 updating one or more of said calendar entries responsive to transit information
received from a transit information system.
5. A computer-implemented method as claimed in claim 4, wherein updating one
or more of said calendar entries comprises changing time data for a calendar entry.
30
6. A computer-implemented method as claimed in claim 4, wherein updating said
one or more calendar entries comprises generating a new, replacement, trip plan, and
replacing said one or more of said calendar entries with one or more new calendar
entries including one or more steps of the new trip plan.
35

7. A computer-implemented method as claimed in claim 6, wherein updating one or more of said calendar entries comprises changing the time data for a calendar entry.
8. A computer-implemented method as claimed in claim 1, wherein said one or
5 more calendar entries are created based on a set of predetermined rules for creating calendar entries for one or more respective trip plan steps.
9. A computer-implemented method as claimed in claim 1, comprising:
causing a generated trip plan to be displayed to a user;
10 receiving a user input indicating that said trip plan should be included in an electronic calendar of the user;
in response to receiving said user input, including at least part of said generated trip plan in the electronic calendar of the user.
- 15 10. A computer-implemented method as claimed in claim 1, comprising:
generating a plurality of trip plans to the target destination, each of said plurality of trip plans including one or more steps and time data for one or more of said steps;
causing said plurality of generated trip plans to be displayed to a user;
20 receiving a user input indicating that a selected one of said plurality of generated trip plans should be included in the electronic calendar of the user;
in response to receiving said user input, including at least part of the user-selected trip plan in the electronic calendar of the user.
- 25 11. A computer-implemented method as claimed in claim 1, wherein each of said one or more trip plans comprises:
an initial leg; and
time data for the start of the initial leg,
wherein the time data for at least one said calendar entry corresponds to the time
30 data for the start time of the initial leg of the trip plan.
12. A computer-implemented method as claimed in claim 11, further comprising providing one or more alerts to a user of the electronic calendar in advance of the start time of the initial leg of the trip plan.

13. A computer-implemented method as claimed in claim 2, wherein each trip plan comprises at least one walking leg comprising one or more walking steps, and a transit leg comprising one or more public transport steps.
- 5 14. A computer-implemented method as claimed in claim 1, comprising:
receiving location information for a user of the electronic calendar from a location tracking service;
updating one or more of said calendar entries based on the received location information.
- 10 15. A computer-implemented method as claimed in claim 1, comprising: receiving a user query specifying at least:
a target destination; and
a time/date to either leave a start location or arrive at the target destination,
15 wherein said one or more trip plans are generated in response to receiving said user query.
16. A computer-implemented method as claimed in claim 15, wherein each of said one or more generated trip plans include respective navigation directions to the target
20 destination using public transportation.
17. A computer-implemented method as claimed in claim 1, wherein:
each of said one or more trip plans includes a public transit leg from a first public transit location to a second public transit location,
25 said public transit leg is included in the electronic calendar of a first user,
at least part of said public transit leg is included in an electronic calendar of a second user, and
wherein including at least part of a trip plan in an electronic calendar of the first user comprises including name data for the second user in a trip plan calendar entry
30 created in the first user's calendar.
18. A system comprising:
a trip plan generator to generate one or more trip plans for one or more trips to a target destination, each trip plan including instructions to reach the target
35 destination, the instructions comprising one or more steps and time data associated with one or more of said steps;

an electronic calendar to store calendar entries and corresponding time data for the calendar entries;

a trip diarising module configured to cause at least part of the trip plan generated for one of said trips to be included in the electronic calendar, wherein
5 including at least a part of a generated trip plan in said electronic calendar comprises creating one or more calendar entries, each calendar entry including one or more steps of the trip plan, wherein time data for said one or more calendar entries corresponds to time data associated with one or more steps of the trip plan.

10 19. A system according to claim 18, further comprising a calendar update module configured to update one or more of said calendar entries responsive to transit information received from a transit information system.

20. A system according to claim 18, wherein the trip plan generator comprises a
15 public transportation journey planning module.

21. A system according to claim 18, further comprising a client device comprising at least one processor and a memory storing instructions which when executed by the processor cause the at least one processor to cause a generated trip plan to be displayed
20 to a user, to receive a user input indicating that said trip plan should be included in an electronic calendar of the user, and to cause the trip plan generator to include at least part of said generated trip plan in the electronic calendar of the user.

22. Apparatus comprising a trip diarising module configured to communicate with
25 a trip plan generator and an electronic calendar,

wherein the trip plan generator is configured to generate one or more trip plans for one or more trips to a target destination, each trip plan including instructions to reach the target destination, the instructions comprising one or more steps and time data associated with one or more of said steps;

30 wherein the electronic calendar is configured to store calendar entries and corresponding time data for the calendar entries,

wherein the trip diarising module is configured to cause at least part of the trip plan generated for one of said trips to be included in the electronic calendar, wherein including at least a part of a generated trip plan in said electronic calendar comprises
35 creating one or more calendar entries, each calendar entry including one or more steps

of the trip plan, wherein time data for said one or more calendar entries corresponds to time data associated with one or more steps of the trip plan.

23. Mobile user device comprising an apparatus as claimed in claim 22.

5

24. A computer program product comprising a computer readable storage medium storing computer executable code operable to:

generate one or more trip plans for one or more trips to a target destination, each trip plan including instructions to reach the target destination, the instructions comprising one or more steps and time data associated with one or more of said steps; and

include at least part of a said generated trip plan in an electronic calendar, wherein the electronic calendar is configured for storing calendar entries including time data for each said calendar entry,

15 wherein including at least a part of a generated trip plan in said electronic calendar comprises creating one or more calendar entries, each calendar entry including one or more steps of the trip plan, wherein time data for said one or more calendar entries corresponds to time data associated with one or more steps of the trip plan.

20

25. A computer-implemented method, comprising:

generating one or more trip plans for one or more trips to a target destination, each trip plan including instructions to reach the target destination, the instructions comprising one or more steps and time data associated with one or more of said steps; and

including at least part of a said generated trip plan in an electronic calendar, wherein the electronic calendar is configured for storing calendar entries including time data for each said calendar entry,

30 wherein including at least a part of a generated trip plan in said electronic calendar comprises creating one or more calendar entries, each calendar entry including one or more steps of the trip plan, wherein time data for said one or more calendar entries corresponds to time data associated with one or more steps of the trip plan.

35 26. A computer-implemented method as claimed in claim 25, wherein each trip plan includes instructions to reach the target destination using public transportation.

27. A computer-implemented method as claimed in claim 26, wherein each trip plan comprises at least one walking leg comprising one or more walking steps, and a transit leg comprising one or more public transport steps.

5

28. A computer-implemented method as claimed in any of claims 25 to 27, further comprising providing an alert at or in advance of the time corresponding to a calendar entry so as to provide a reminder of the time that a step of the trip plan should be carried out.

10

29. A computer-implemented method as claimed in any of claims 25 to 28, further comprising updating one or more of said calendar entries responsive to transit information received from a transit information system.

15

30. A computer-implemented method as claimed in claim 29, wherein updating said one or more calendar entries comprises generating a new, replacement, trip plan, and replacing said one or more of said calendar entries with one or more new calendar entries including one or more steps of the new trip plan.

20

31. A computer-implemented method as claimed in claim 29 or claim 30, wherein updating one or more of said calendar entries comprises changing the time data for a calendar entry.

32. A computer-implemented method as claimed in any of claims 25 to 31, wherein said one or more calendar entries are created based on a set of predetermined rules for creating calendar entries for one or more respective trip plan steps.

25

33. A computer-implemented method as claimed in any of claims 25-32, comprising:

30

causing a generated trip plan to be displayed to a user;
receiving a user input indicating that said trip plan should be included in an electronic calendar of the user;
in response to receiving said user input, including at least part of said generated trip plan in the electronic calendar of the user.

35

34 A computer-implemented method as claimed in any of claims 25-33, comprising:

generating a plurality of trip plans to the target destination, each of said plurality of trip plans including one or more steps and time data for one or more of said steps;
5 causing said plurality of generated trip plans to be displayed to a user;
receiving a user input indicating that a selected one of said plurality of generated trip plans should be included in the electronic calendar of the user;
in response to receiving said user input, including at least part of the
10 user-selected trip plan in the electronic calendar of the user.

35. A computer-implemented method as claimed in any of claims 25-34, wherein each of said one or more trip plans comprises:

an initial leg; and
15 time data for the start of the initial leg,
wherein the time data for at least one said calendar entry corresponds to the time data for the start time of the initial leg of the trip plan.

36. A computer-implemented method as claimed in claim 35, further comprising
20 providing one or more alerts to a user of the electronic calendar in advance of the start time of the initial leg of the trip plan.

37. A computer-implemented method as claimed in any of claims 25 to 36, comprising:

25 receiving location information for a user of the electronic calendar from a location tracking service;
updating one or more of said calendar entries based on the received location information.

30 38. A computer-implemented method as claimed in any of claims 25 to 37 comprising: receiving a user query specifying at least:
a target destination; and
a time/date to either leave a start location or arrive at the target destination,
wherein said one or more trip plans are generated in response to receiving said user
35 query.

39. A computer-implemented method as claimed in claim 38, wherein each of said one or more generated trip plans include respective navigation directions to the target destination using public transportation.

5 40. A computer-implemented method as claimed in any of claims 25 to 39, wherein:
each of said one or more trip plans includes a public transit leg from a first public transit location to a second public transit location,
said public transit leg is included in the electronic calendar of a first user,
at least part of said public transit leg is included in an electronic calendar of a
10 second user, and
wherein including at least part of a trip plan in an electronic calendar of the first user comprises including name data for the second user in a trip plan calendar entry created in the first user's calendar.

15 41. An apparatus comprising at least one processor at least one memory storing instructions which when executed by the at least one processor cause the at least one processor to perform the method of any of claims 25 to 40.

42. A computer program product comprising a computer readable storage medium
20 storing computer executable code operable to perform the method of any of claims 25 to 40.

43. An app to be downloaded to a user device, which when executed causes the method of claim 1, or of any of claims 25-40, to be performed.

1 / 3

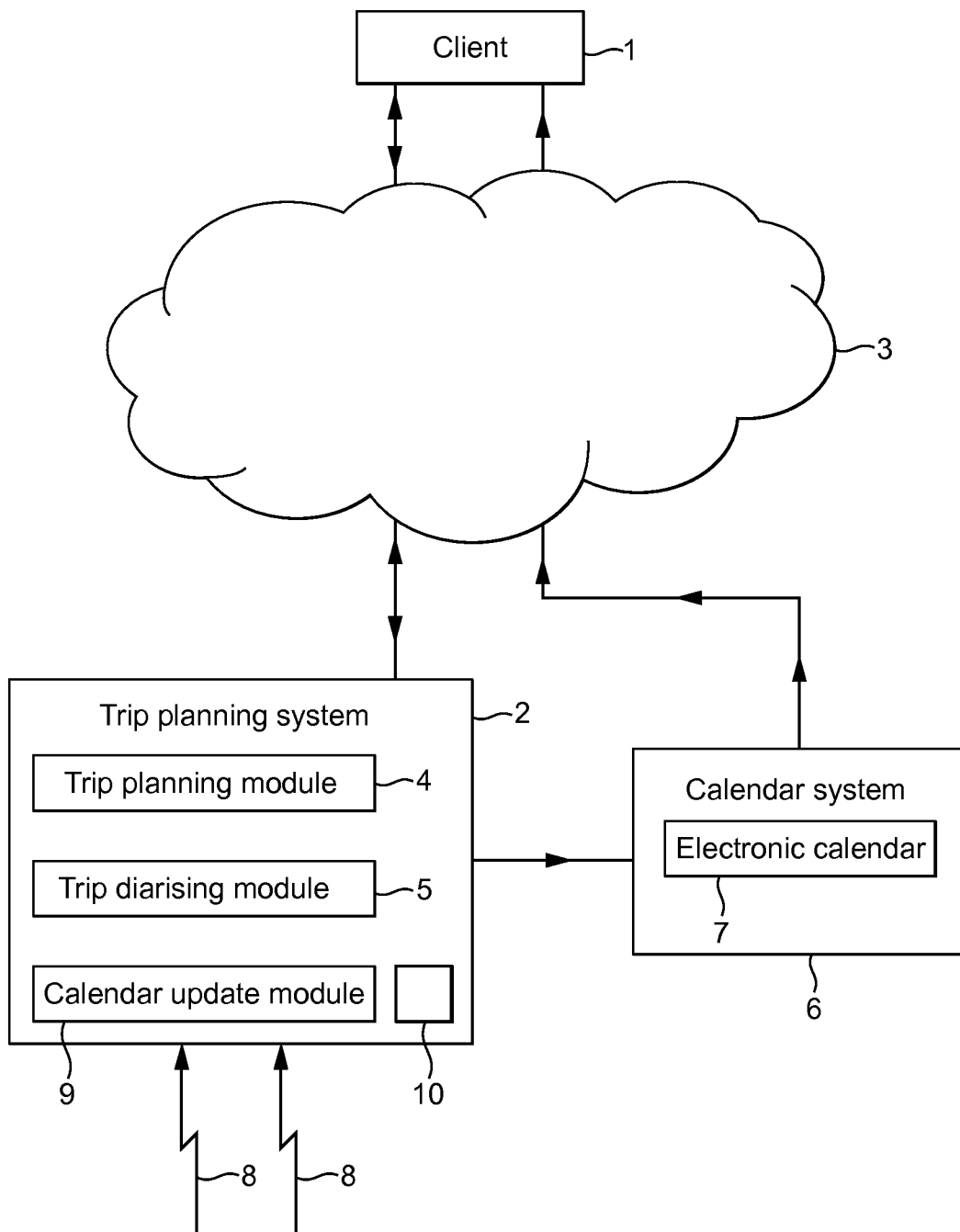


FIG. 1

2 / 3

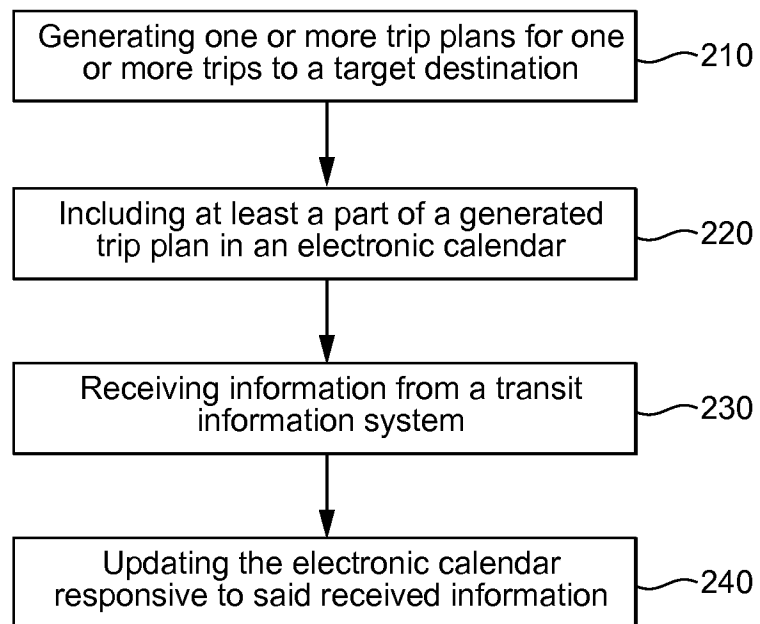


FIG. 2

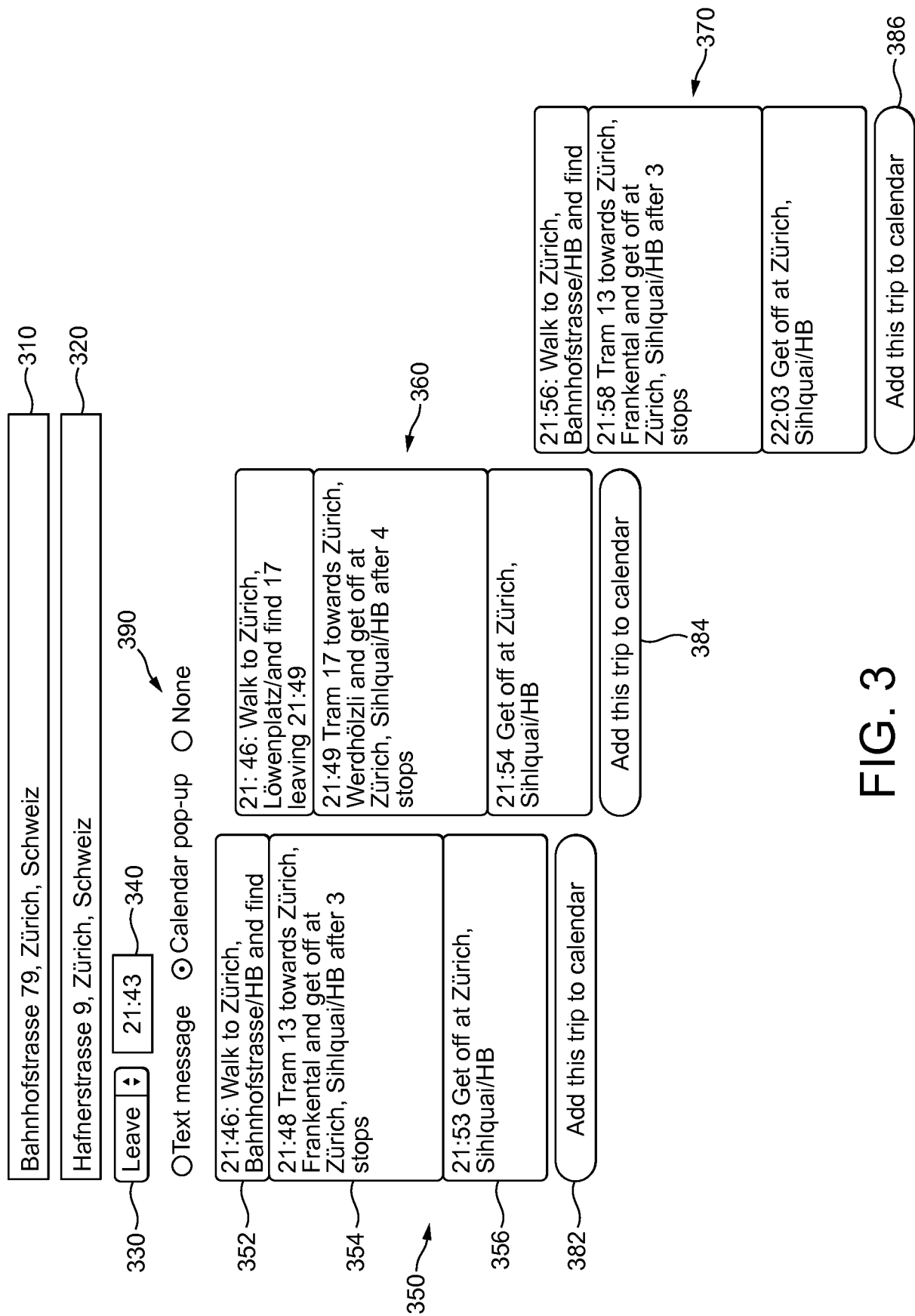


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2012/053696

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - G01C 21/34 (2012.01) USPC - 701/533 According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC(8) - G01C 21/34, 21/36; G08G 1/0969 (2012.01) USPC - 340/995.1, 995.13, 995.19; 701/1, 532, 533; 705/14.64 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatBase, Google Scholar				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
Y	WO 2011/160044 A2 (NORTON et al) 22 December 2011 (22.12.2011) entire document	1-28		
Y	US 8,166,019 B1 (LEE et al) 24 April 2012 (24.04.2012) entire document	1-28		
Y	US 2011/0112759 A1 (BAST et al) 12 May 2011 (12.05.2011) entire document	2, 4-7, 13, 15-17, 19-20, 26-27		
Y	US 2009/0313074 A1 (HARPUR et al) 17 December 2009 (17.12.2009) entire document	6-7		
☐ Further documents are listed in the continuation of Box C. ☐				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td style="width: 50%; vertical-align: top;"> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family </td> </tr> </table>			* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family			
Date of the actual completion of the international search 20 November 2012		Date of mailing of the international search report 17 DEC 2012		
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774		

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2012/053696

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☒ Claims Nos.: 29-43
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.