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NESBITT et al.

(54) **IDENTIFYING A ROUTE CONFIGURED TO TRAVEL THROUGH MULTIPLE POINTS OF INTEREST**

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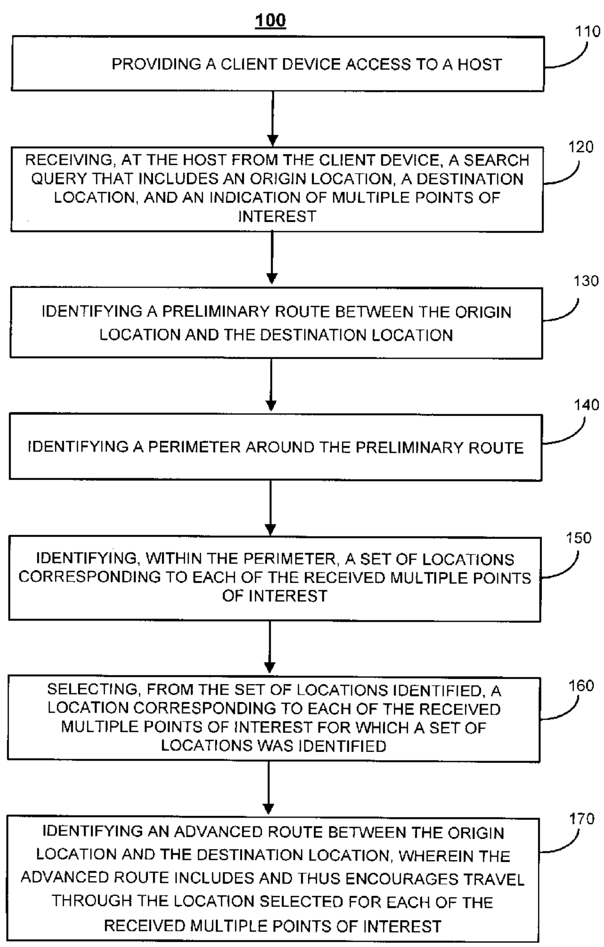
CPC ***G01C 21/00*** (2013.01)
USPC **701/408**

(57) **ABSTRACT**

A computer-implemented method for identifying a route that is configured to travel through multiple points of interest includes receiving a query that includes an origin location, a destination location, and at least a first point of interest and a second point of interest. The method also includes identifying a perimeter that surrounds the received origin and destination locations in response to the query. The perimeter is then used to identify a set of locations for each of the first and second points of interest.



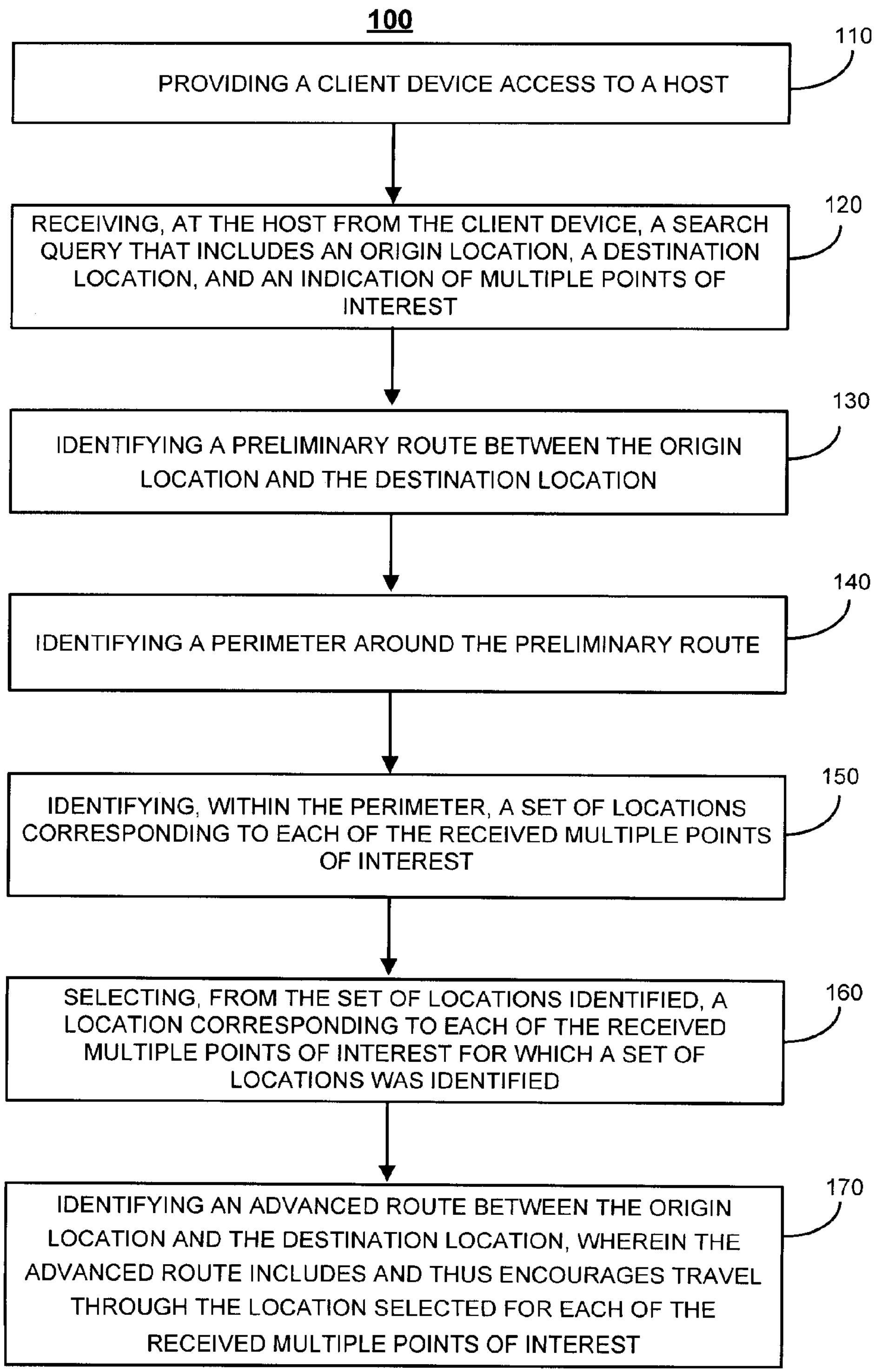

100
PROVIDING A CLIENT DEVICE ACCESS TO A HOST
110
RECEIVING, AT THE HOST FROM THE CLIENT DEVICE, A SEARCH QUERY THAT INCLUDES AN ORIGIN LOCATION, A DESTINATION LOCATION, AND AN INDICATION OF MULTIPLE POINTS OF INTEREST
120
IDENTIFYING A PRELIMINARY ROUTE BETWEEN THE ORIGIN LOCATION AND THE DESTINATION LOCATION
130
IDENTIFYING A PERIMETER AROUND THE PRELIMINARY ROUTE
140
IDENTIFYING, WITHIN THE PERIMETER, A SET OF LOCATIONS CORRESPONDING TO EACH OF THE RECEIVED MULTIPLE POINTS OF INTEREST
150
SELECTING, FROM THE SET OF LOCATIONS IDENTIFIED, A LOCATION CORRESPONDING TO EACH OF THE RECEIVED MULTIPLE POINTS OF INTEREST FOR WHICH A SET OF LOCATIONS WAS IDENTIFIED
160
IDENTIFYING AN ADVANCED ROUTE BETWEEN THE ORIGIN LOCATION AND THE DESTINATION LOCATION, WHEREIN THE ADVANCED ROUTE INCLUDES AND THUS ENCOURAGES TRAVEL THROUGH THE LOCATION SELECTED FOR EACH OF THE RECEIVED MULTIPLE POINTS OF INTEREST
170

FIG. 1

200A

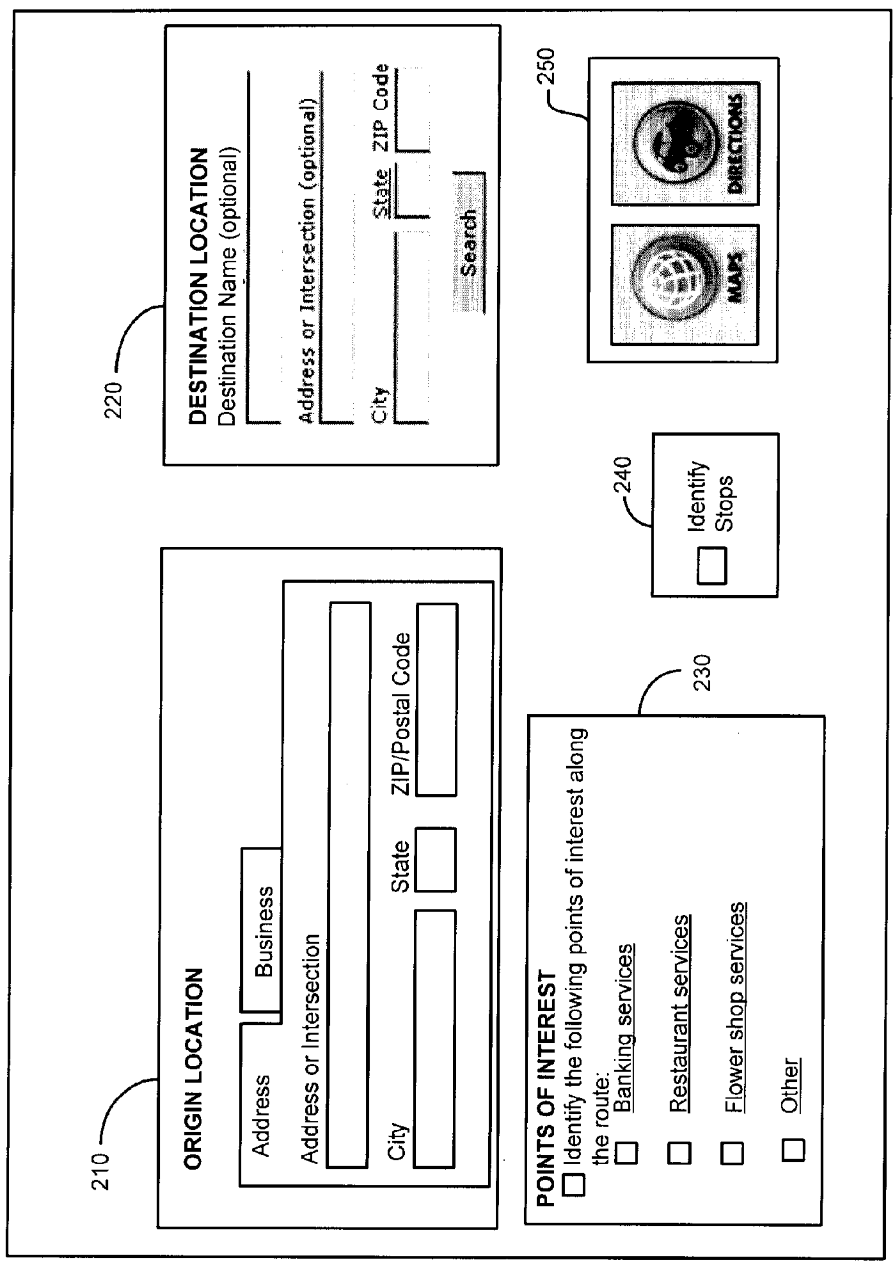

210
ORIGIN LOCATION
Address
Business
Address or Intersection
City
State
ZIP/Postal Code
220
DESTINATION LOCATION
Destination Name (optional)
Address or Intersection (optional)
City
State
ZIP Code
Search
230
POINTS OF INTEREST
Identify the following points of interest along the route:
Banking services
Restaurant services
Flower shop services
Other
240
Identify Stops
250
MAPS
DIRECTIONS

FIG. 2A

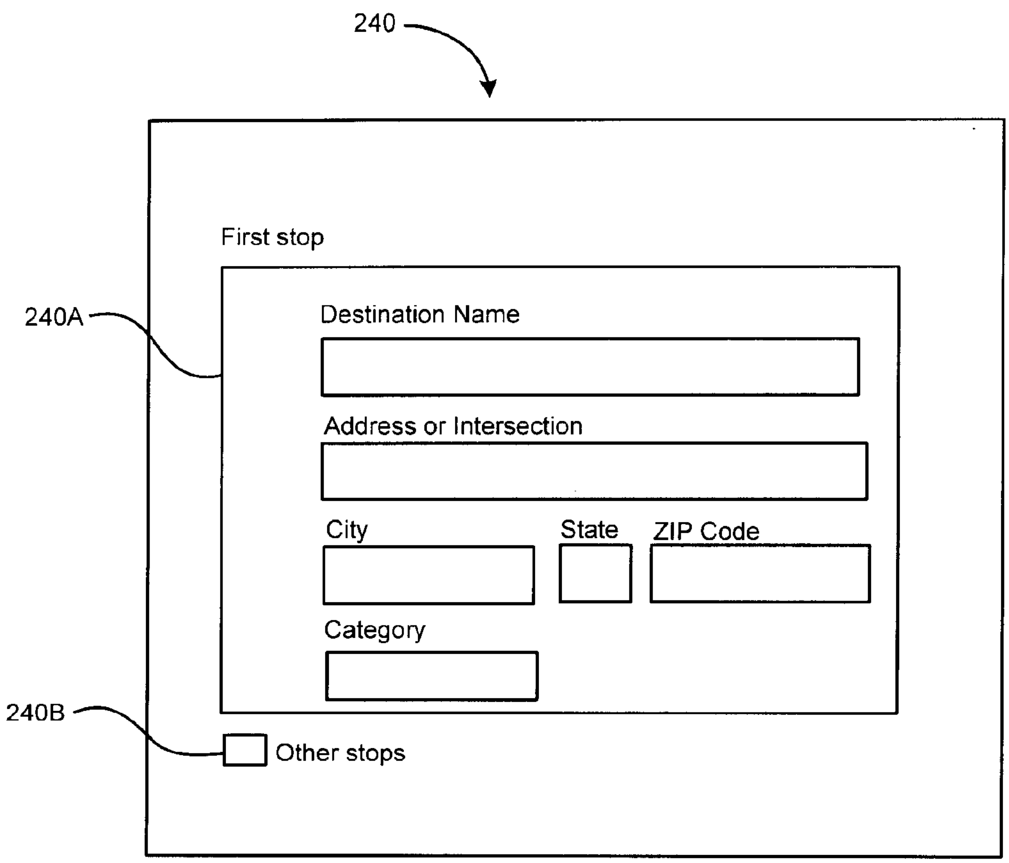

240
First stop
240A
Destination Name
Address or Intersection
City
State
ZIP Code
Category
240B
Other stops

FIG. 2B

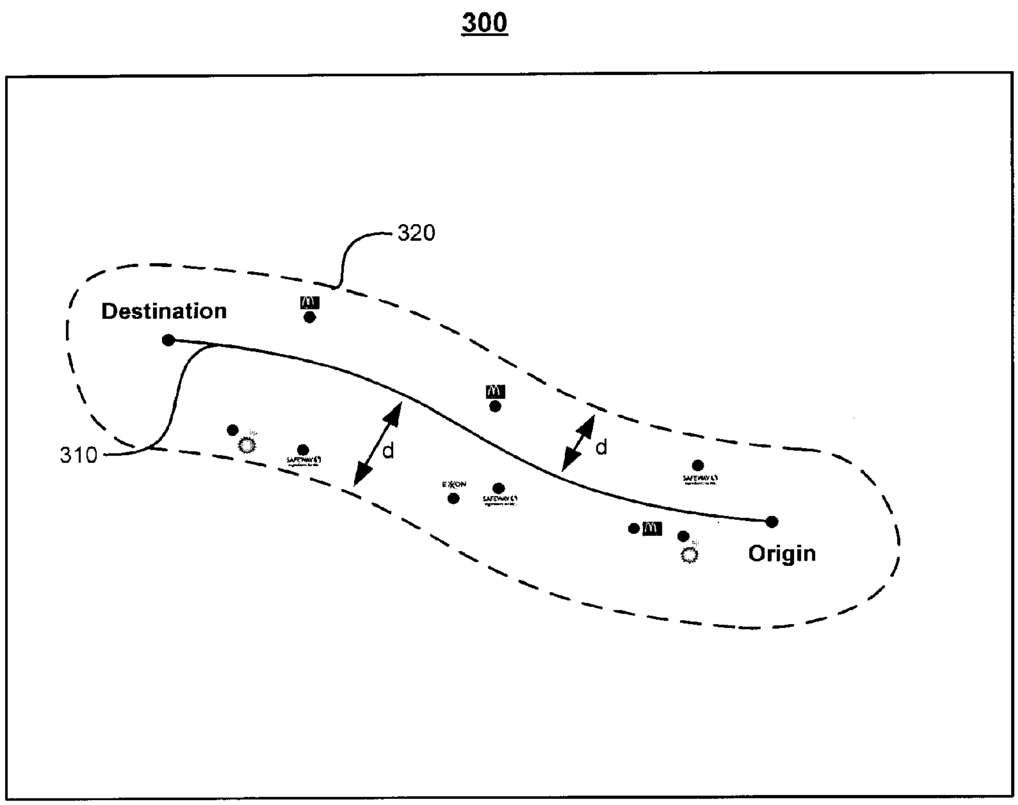


FIG. 3

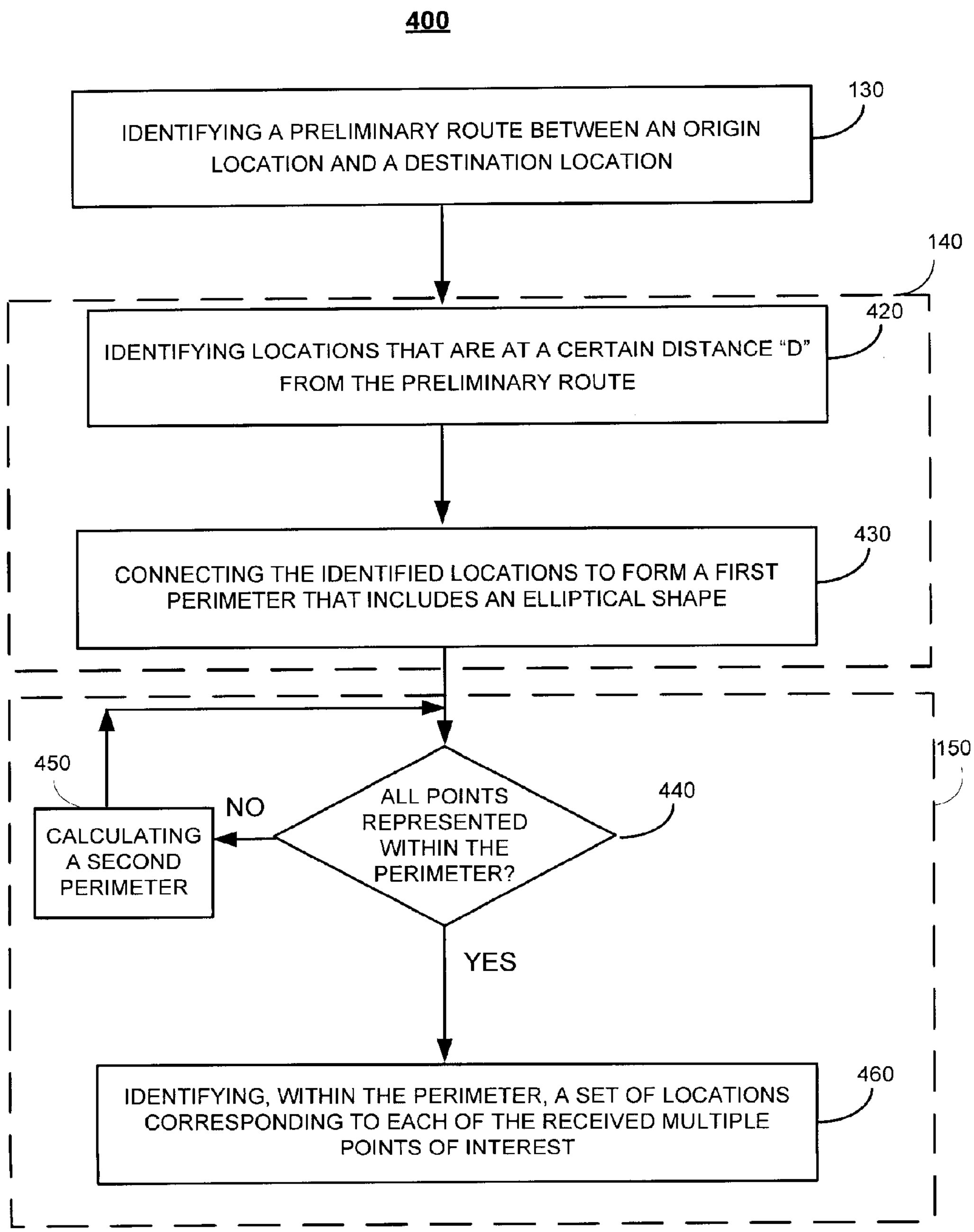

400
130
IDENTIFYING A PRELIMINARY ROUTE BETWEEN AN ORIGIN LOCATION AND A DESTINATION LOCATION
140
420
IDENTIFYING LOCATIONS THAT ARE AT A CERTAIN DISTANCE "D" FROM THE PRELIMINARY ROUTE
430
CONNECTING THE IDENTIFIED LOCATIONS TO FORM A FIRST PERIMETER THAT INCLUDES AN ELLIPTICAL SHAPE
150
450
CALCULATING A SECOND PERIMETER
NO
440
ALL POINTS REPRESENTED WITHIN THE PERIMETER?
YES
460
IDENTIFYING, WITHIN THE PERIMETER, A SET OF LOCATIONS CORRESPONDING TO EACH OF THE RECEIVED MULTIPLE POINTS OF INTEREST

FIG. 4

500A

TYPE OF INTEREST (510)	CLOSEST CHOICES (520)	NEXT CLOSEST CHOICES (530)	NEXT CLOSEST CHOICES (540)
Gas Station	1210 Seven Lock Rd Potomac Maryland (0.2 mile away from the preliminary route)	1335 Wisconsin Ave. Rockville, Maryland (0.6 mile away from The preliminary route)	4444 Rockville Pike Rockville, Maryland (1 mile away from the preliminary route)
Restaurant	555 Tuckerman Lane Potomac, Maryland (0.5 mile away from the preliminary route)	555 Tuckerman Lane Potomac, Maryland (0.5 mile away from the preliminary route)	111 Rockville Pike Rockville, Maryland (0.9 mile away from the preliminary route)
Grocery Store	1213 Seven Lock Rd Potomac, Maryland (0.2 mile away from the preliminary route)	1212 Tuckerman Lane, Potomac Maryland (0.7 miles away from the preliminary route)	333 Rockville Pike, Rockville, Maryland (1.5 miles away from the preliminary route)
Travel Time (550)	45 min	50 min	70 min
Travel Distance (560)	25 miles	30 miles	40 miles

FIG. 5A

500B

	520 CLOSEST CHOICES	530 NEXT CLOSEST CHOICES	540 NEXT CLOSEST CHOICES
Stop 1	McDonald's™ at 555 Tuckerman Lane Potomac, Maryland (0.5 mile away from the preliminary route)	Safeway™ at 1212 Tuckerman Lane Potomac Maryland (0.7 miles away from the preliminary route)	bp™ gas station at 4444 Rockville Pike Rockville, Maryland (1 mile away from the preliminary route)
Stop 2	bp™ gas station at 1210 Seven Lock Rd Potomac Maryland (0.2 mile away from the preliminary route)	McDonald's™ at 555 Tuckerman Lane Potomac, Maryland (0.5 mile away from the preliminary route)	Safeway™ at 333 Rockville Pike, Rockville, Maryland (1.5 miles away from the preliminary route)
Stop 3	Safeway™ at 1213 Seven Lock Rd Potomac, Maryland (0.2 mile away from the preliminary route)	Exxon™ gas station at 1335 Wisconsin Ave. Rockville, Maryland (0.6 mile away from The preliminary route)	McDonald's™ at 111 Rockville Pike Rockville, Maryland (0.9 mile away from the preliminary route)
550 Travel Time	44 min	49 min	67 min
560 Travel Distance	24.8 miles	29.9 miles	39 miles

FIG. 5B

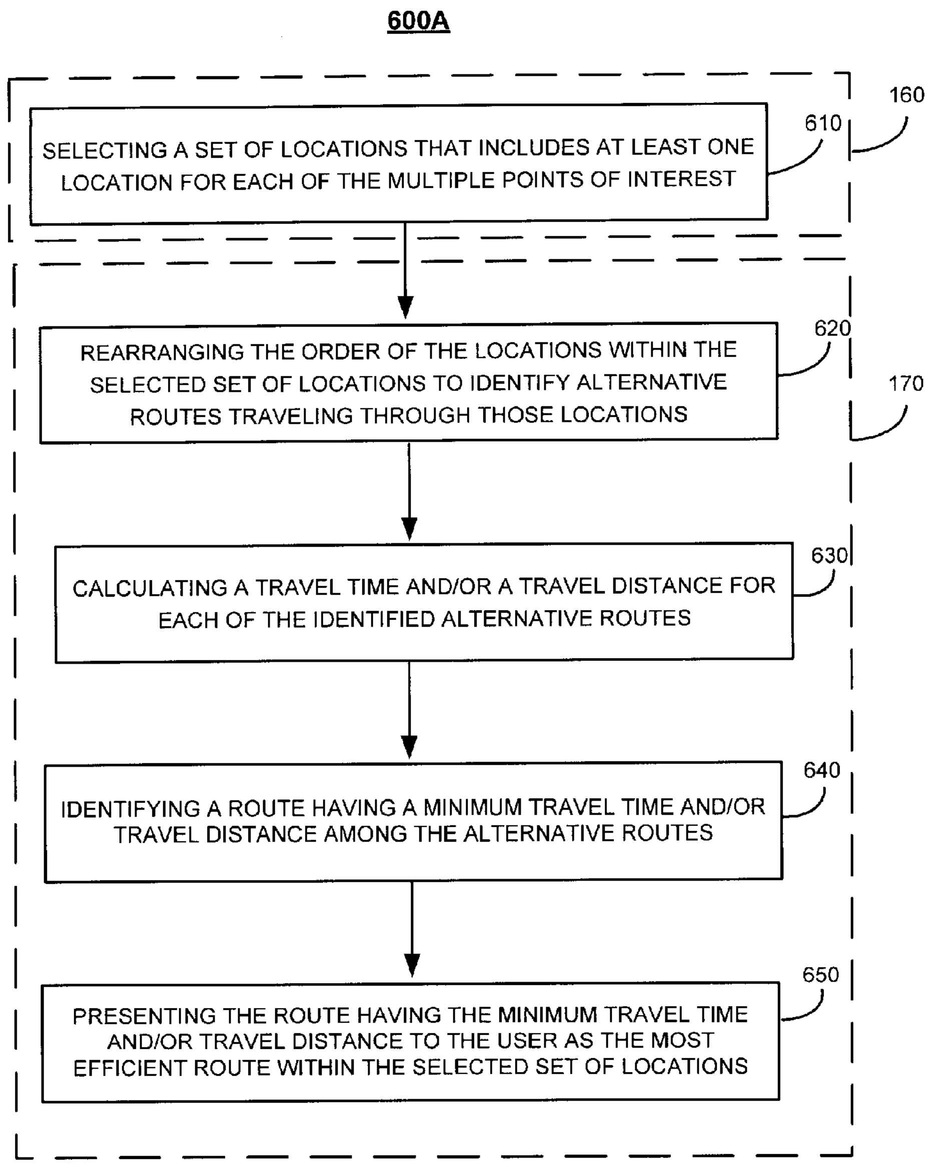

600A
160
610
SELECTING A SET OF LOCATIONS THAT INCLUDES AT LEAST ONE LOCATION FOR EACH OF THE MULTIPLE POINTS OF INTEREST
620
REARRANGING THE ORDER OF THE LOCATIONS WITHIN THE SELECTED SET OF LOCATIONS TO IDENTIFY ALTERNATIVE ROUTES TRAVELING THROUGH THOSE LOCATIONS
170
630
CALCULATING A TRAVEL TIME AND/OR A TRAVEL DISTANCE FOR EACH OF THE IDENTIFIED ALTERNATIVE ROUTES
640
IDENTIFYING A ROUTE HAVING A MINIMUM TRAVEL TIME AND/OR TRAVEL DISTANCE AMONG THE ALTERNATIVE ROUTES
650
PRESENTING THE ROUTE HAVING THE MINIMUM TRAVEL TIME AND/OR TRAVEL DISTANCE TO THE USER AS THE MOST EFFICIENT ROUTE WITHIN THE SELECTED SET OF LOCATIONS

FIG. 6A

600B

ALTERNATIVE ADVANCED ROUTES WITHIN THE CLOSEST CHOICES COLUMN 520	660 FIRST ALTERNATIVE	670 SECOND ALTERNATIVE	680 THIRD ALTERNATIVE
	McDonald's™ at 555 Tuckerman Lane Potomac, Maryland (0.5 mile away from the preliminary route)	McDonald's™ at 555 Tuckerman Lane Potomac, Maryland (0.5 mile away from the preliminary route)	Safeway™ at 1213 Seven Lock Rd Potomac, Maryland (0.2 mile away from the preliminary route)
	bp™ gas station at 1210 Seven Lock Rd Potomac Maryland (0.2 mile away from the preliminary route)	Safeway™ at 1213 Seven Lock Rd Potomac, Maryland (0.2 mile away from the preliminary route)	McDonald's™ at 555 Tuckerman Lane Potomac, Maryland (0.5 mile away from the preliminary route)
	Safeway™ at 1213 Seven Lock Rd Potomac, Maryland (0.2 mile away from the preliminary route)	bp™ gas station at 1210 Seven Lock Rd Potomac Maryland (0.2 mile away from the preliminary route)	bp™ gas station at 1210 Seven Lock Rd Potomac Maryland (0.2 mile away from the preliminary route)
690A Travel Time	44 min	46 min	47 min
690B Travel Distance	24.8 miles	25.1 miles	25.2 miles

FIG. 6B

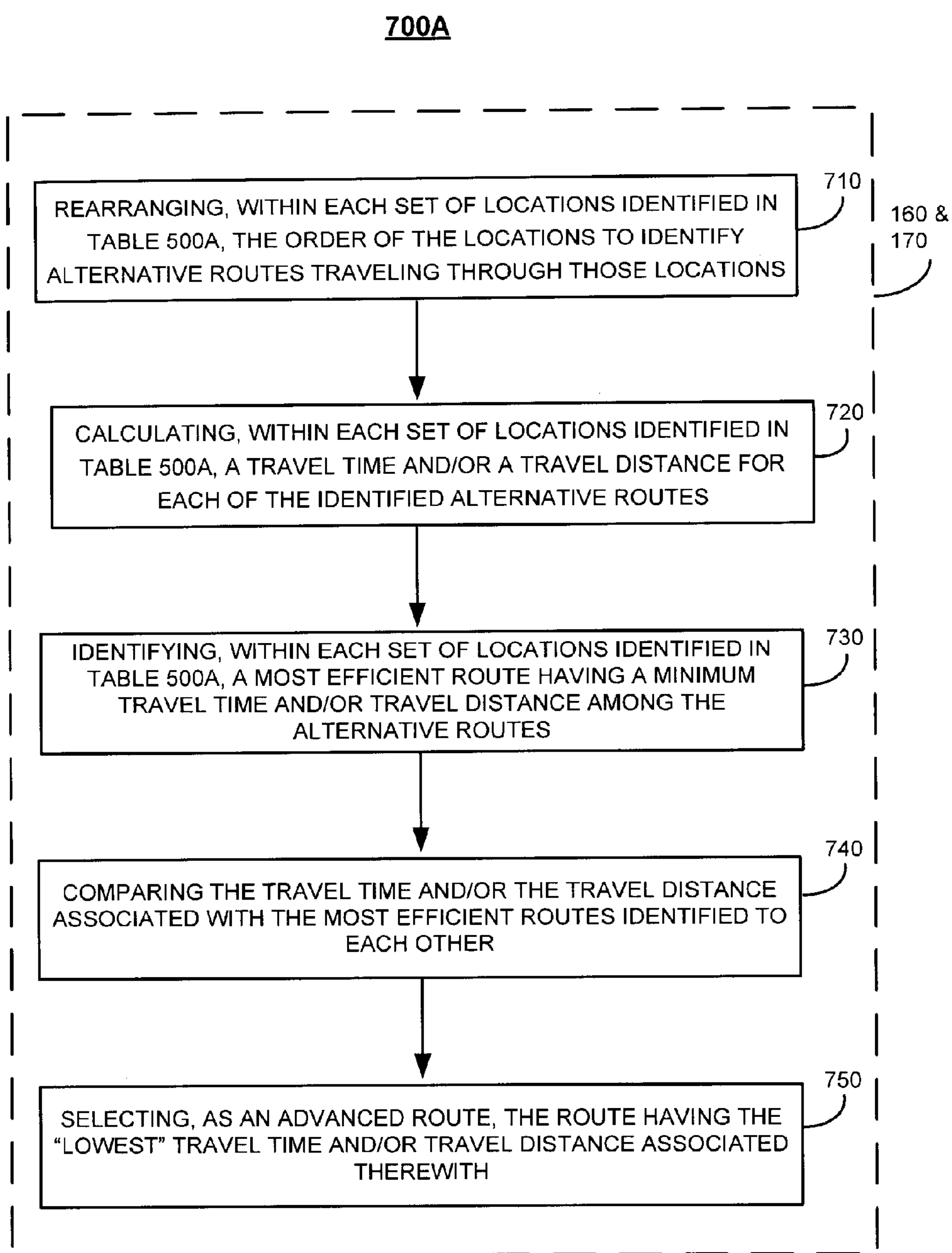

700A
REARRANGING, WITHIN EACH SET OF LOCATIONS IDENTIFIED IN TABLE 500A, THE ORDER OF THE LOCATIONS TO IDENTIFY ALTERNATIVE ROUTES TRAVELING THROUGH THOSE LOCATIONS
710
160 & 170
CALCULATING, WITHIN EACH SET OF LOCATIONS IDENTIFIED IN TABLE 500A, A TRAVEL TIME AND/OR A TRAVEL DISTANCE FOR EACH OF THE IDENTIFIED ALTERNATIVE ROUTES
720
IDENTIFYING, WITHIN EACH SET OF LOCATIONS IDENTIFIED IN TABLE 500A, A MOST EFFICIENT ROUTE HAVING A MINIMUM TRAVEL TIME AND/OR TRAVEL DISTANCE AMONG THE ALTERNATIVE ROUTES
730
COMPARING THE TRAVEL TIME AND/OR THE TRAVEL DISTANCE ASSOCIATED WITH THE MOST EFFICIENT ROUTES IDENTIFIED TO EACH OTHER
740
SELECTING, AS AN ADVANCED ROUTE, THE ROUTE HAVING THE "LOWEST" TRAVEL TIME AND/OR TRAVEL DISTANCE ASSOCIATED THEREWITH
750

FIG. 7A

700B

	THE MOST EFFICIENT ROUTE WITHIN THE CLOSEST CHOICES COLUMN 520	THE MOST EFFICIENT ROUTE WITHIN THE NEXT CLOSEST CHOICES COLUMN 530	THE MOST EFFICIENT ROUTE WITHIN THE NEXT CLOSEST CHOICES COLUMN 540
TRAVEL TIME	44 min.	43 min.	55 min.
TRAVEL DISTANCE	24.8 miles	24.9 miles	30 miles

740

750

FIG. 7B

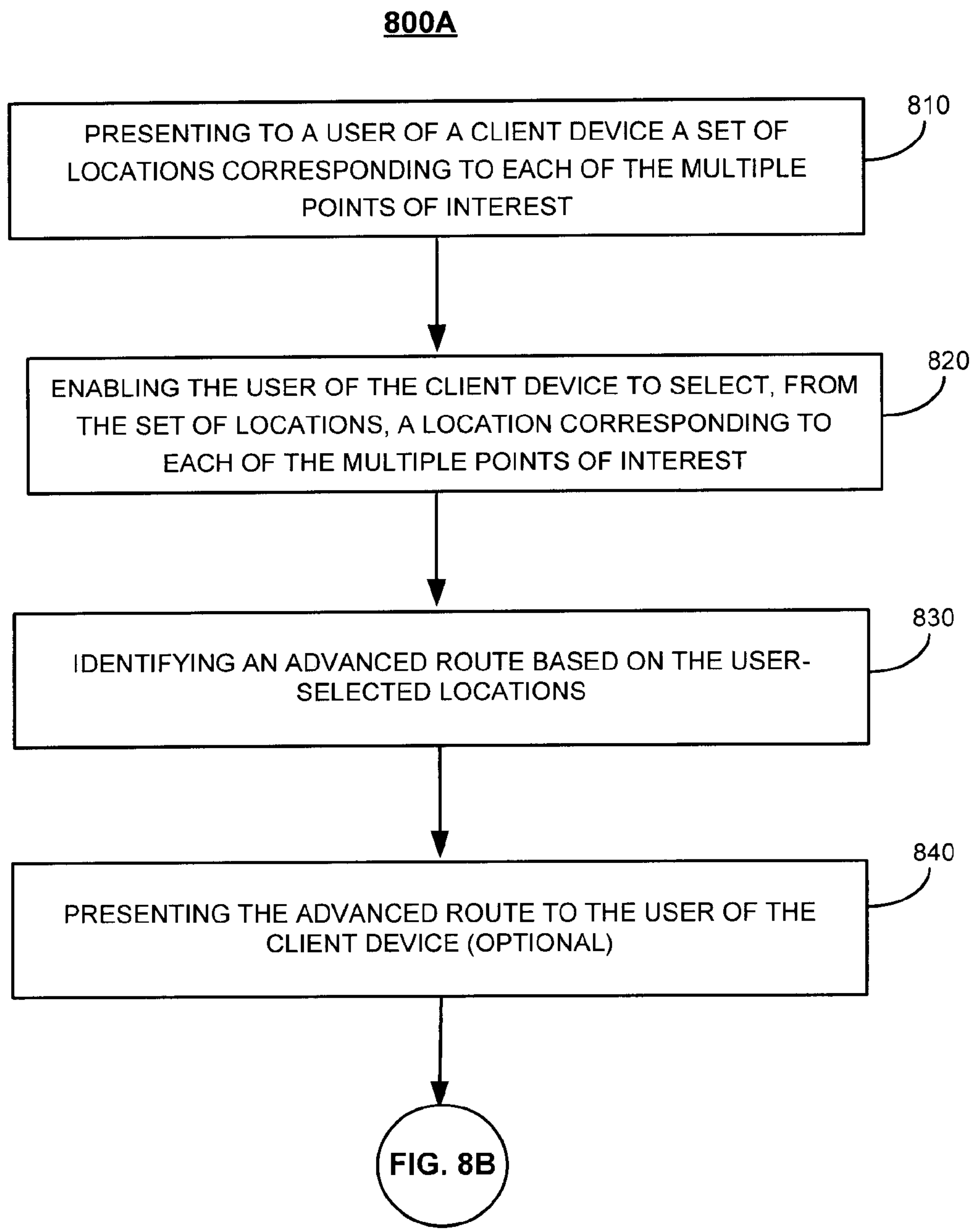

800A
PRESENTING TO A USER OF A CLIENT DEVICE A SET OF LOCATIONS CORRESPONDING TO EACH OF THE MULTIPLE POINTS OF INTEREST
810
ENABLING THE USER OF THE CLIENT DEVICE TO SELECT, FROM THE SET OF LOCATIONS, A LOCATION CORRESPONDING TO EACH OF THE MULTIPLE POINTS OF INTEREST
820
IDENTIFYING AN ADVANCED ROUTE BASED ON THE USER-SELECTED LOCATIONS
830
PRESENTING THE ADVANCED ROUTE TO THE USER OF THE CLIENT DEVICE (OPTIONAL)
840
FIG. 8B

FIG. 8A

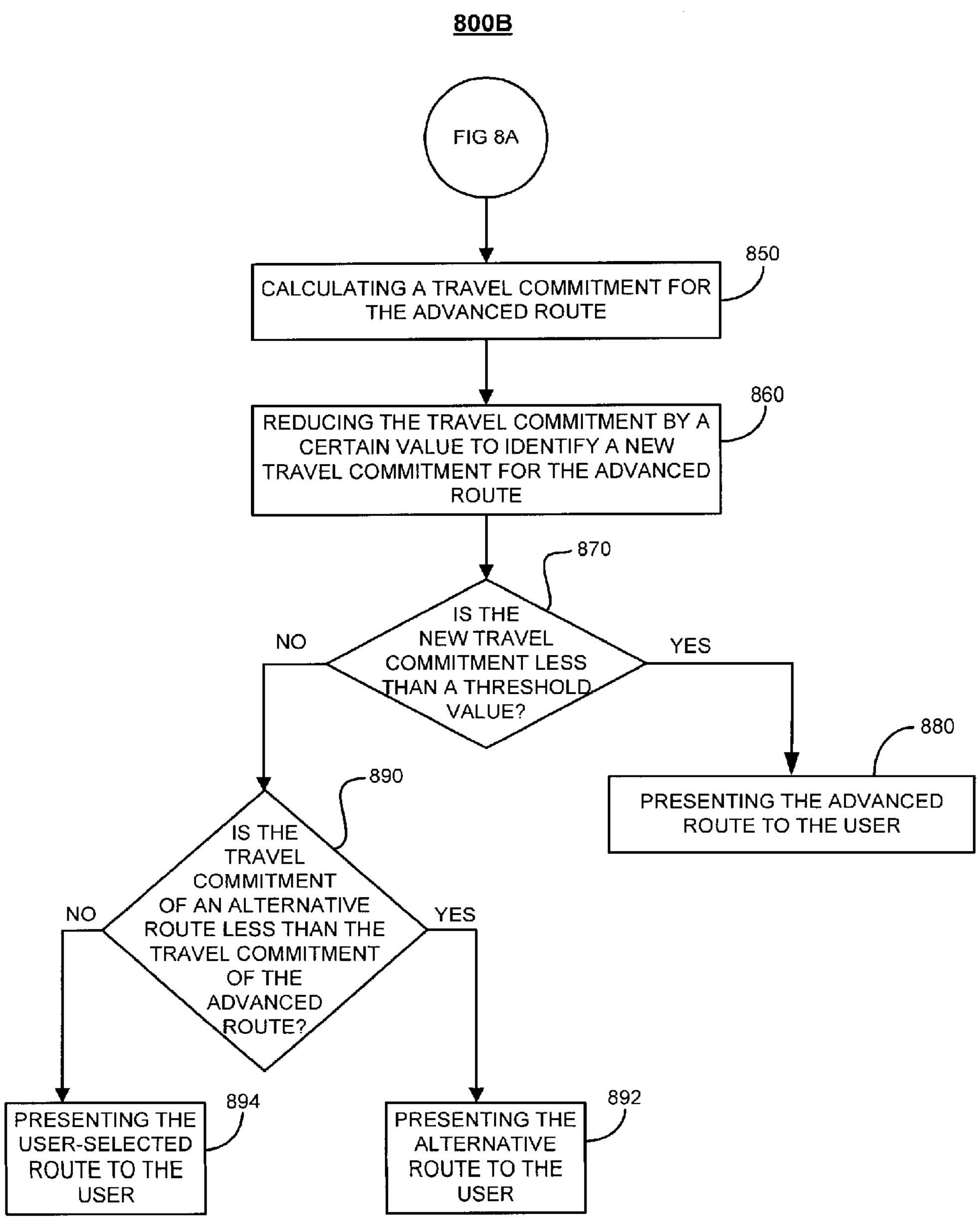

800B
FIG 8A
CALCULATING A TRAVEL COMMITMENT FOR THE ADVANCED ROUTE
850
REDUCING THE TRAVEL COMMITMENT BY A CERTAIN VALUE TO IDENTIFY A NEW TRAVEL COMMITMENT FOR THE ADVANCED ROUTE
860
IS THE NEW TRAVEL COMMITMENT LESS THAN A THRESHOLD VALUE?
870
NO
YES
PRESENTING THE ADVANCED ROUTE TO THE USER
880
IS THE TRAVEL COMMITMENT OF AN ALTERNATIVE ROUTE LESS THAN THE TRAVEL COMMITMENT OF THE ADVANCED ROUTE?
890
NO
YES
PRESENTING THE USER-SELECTED ROUTE TO THE USER
894
PRESENTING THE ALTERNATIVE ROUTE TO THE USER
892

FIG. 8B

900A

You have identified the starting location as (1425 K St. NW, Washington D.C. 20005).
You have identified the destination location as the (United States Patent and Trademark Office).
You have identified the following points of interest that you should visit on your way: (Gas station and Grocery store).

The following are suggested routes that are configured to include the identified points of interest:

☐ Route A (The total travel time is 45 minutes):
You should travel from the starting location to the Grocery store at (1235 Gainsborough Rd., Alexandria, VA, 20854).
From the Grocery store you should travel to the Gas station at (333 Lane Rd., Alexandria, VA 20007).
From the Gas station you should travel to the USPTO at (1233 Commissioner Avenue, Alexandria, VA 25432)

☐ Route B (The total travel time is 60 minutes):
You should travel from the starting location to the Gas station at (1111 Old Town, Alexandria, VA, 20854).
From the Gas station store you should travel to the Grocery store at (222 Commissioner Avenue, Alexandria 21654).
From the Grocery store you should travel to the USPTO at (1233 Commissioner Avenue, Alexandria, VA 25432)

FIG. 9A

900B

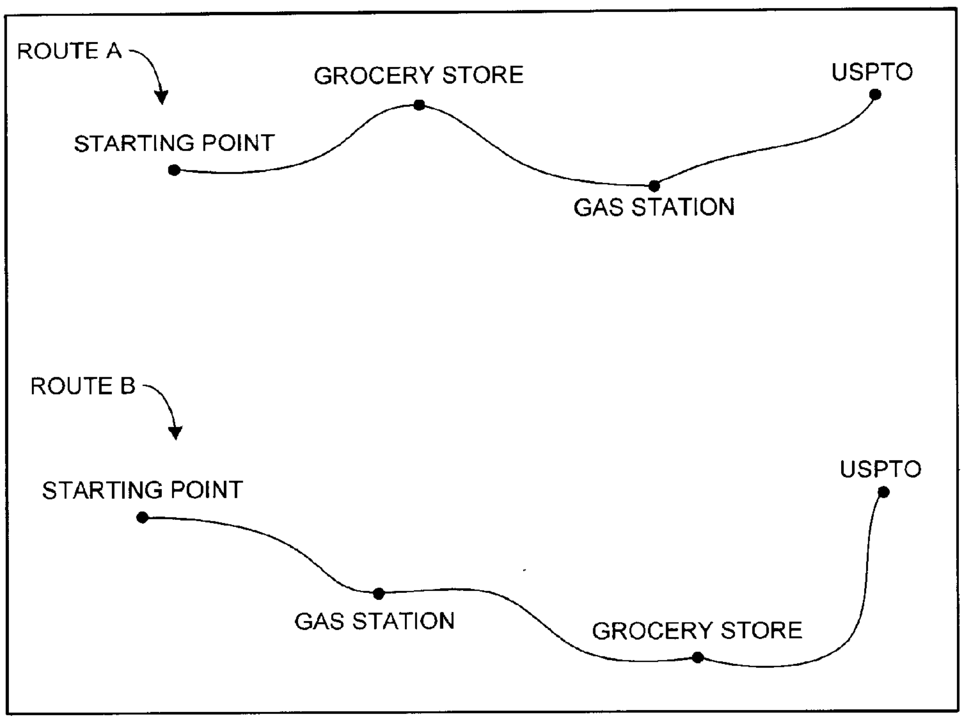

ROUTE A
STARTING POINT
GROCERY STORE
GAS STATION
USPTO
ROUTE B
STARTING POINT
GAS STATION
GROCERY STORE
USPTO

FIG. 9B

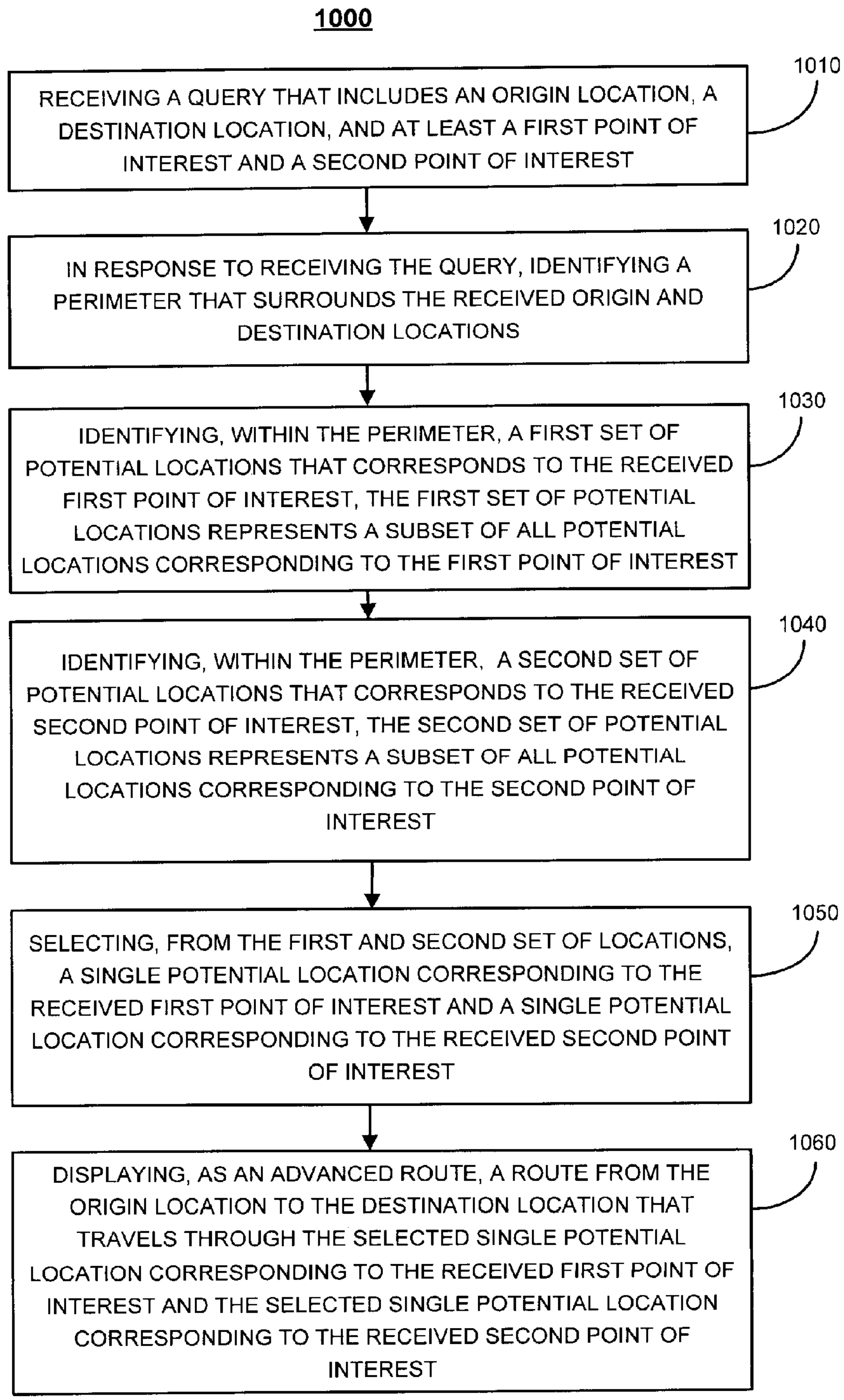

1000
RECEIVING A QUERY THAT INCLUDES AN ORIGIN LOCATION, A DESTINATION LOCATION, AND AT LEAST A FIRST POINT OF INTEREST AND A SECOND POINT OF INTEREST
1010
IN RESPONSE TO RECEIVING THE QUERY, IDENTIFYING A PERIMETER THAT SURROUNDS THE RECEIVED ORIGIN AND DESTINATION LOCATIONS
1020
IDENTIFYING, WITHIN THE PERIMETER, A FIRST SET OF POTENTIAL LOCATIONS THAT CORRESPONDS TO THE RECEIVED FIRST POINT OF INTEREST, THE FIRST SET OF POTENTIAL LOCATIONS REPRESENTS A SUBSET OF ALL POTENTIAL LOCATIONS CORRESPONDING TO THE FIRST POINT OF INTEREST
1030
IDENTIFYING, WITHIN THE PERIMETER, A SECOND SET OF POTENTIAL LOCATIONS THAT CORRESPONDS TO THE RECEIVED SECOND POINT OF INTEREST, THE SECOND SET OF POTENTIAL LOCATIONS REPRESENTS A SUBSET OF ALL POTENTIAL LOCATIONS CORRESPONDING TO THE SECOND POINT OF INTEREST
1040
SELECTING, FROM THE FIRST AND SECOND SET OF LOCATIONS, A SINGLE POTENTIAL LOCATION CORRESPONDING TO THE RECEIVED FIRST POINT OF INTEREST AND A SINGLE POTENTIAL LOCATION CORRESPONDING TO THE RECEIVED SECOND POINT OF INTEREST
1050
DISPLAYING, AS AN ADVANCED ROUTE, A ROUTE FROM THE ORIGIN LOCATION TO THE DESTINATION LOCATION THAT TRAVELS THROUGH THE SELECTED SINGLE POTENTIAL LOCATION CORRESPONDING TO THE RECEIVED FIRST POINT OF INTEREST AND THE SELECTED SINGLE POTENTIAL LOCATION CORRESPONDING TO THE RECEIVED SECOND POINT OF INTEREST
1060

FIG. 10

1100

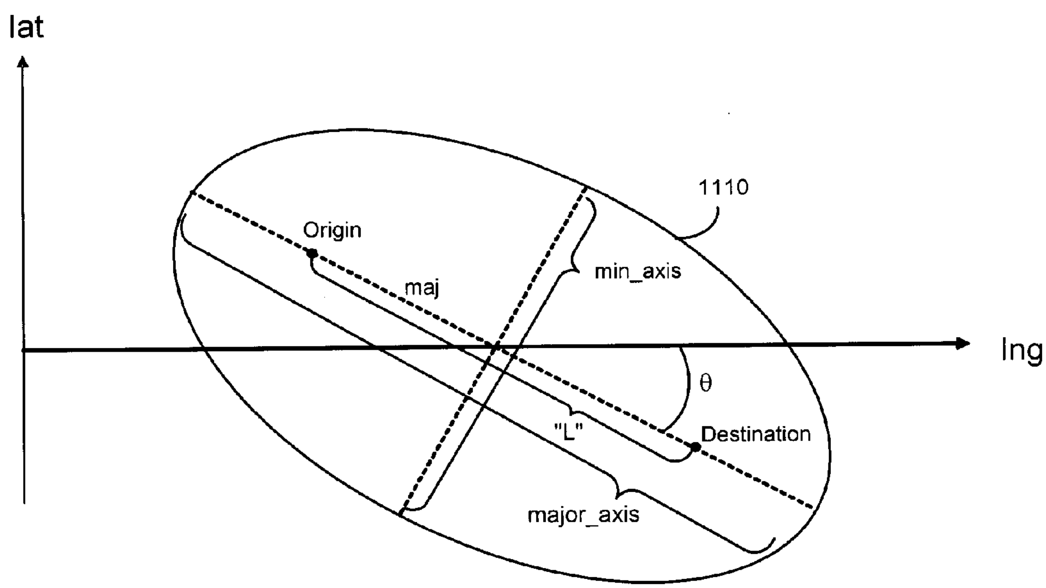


FIG. 11

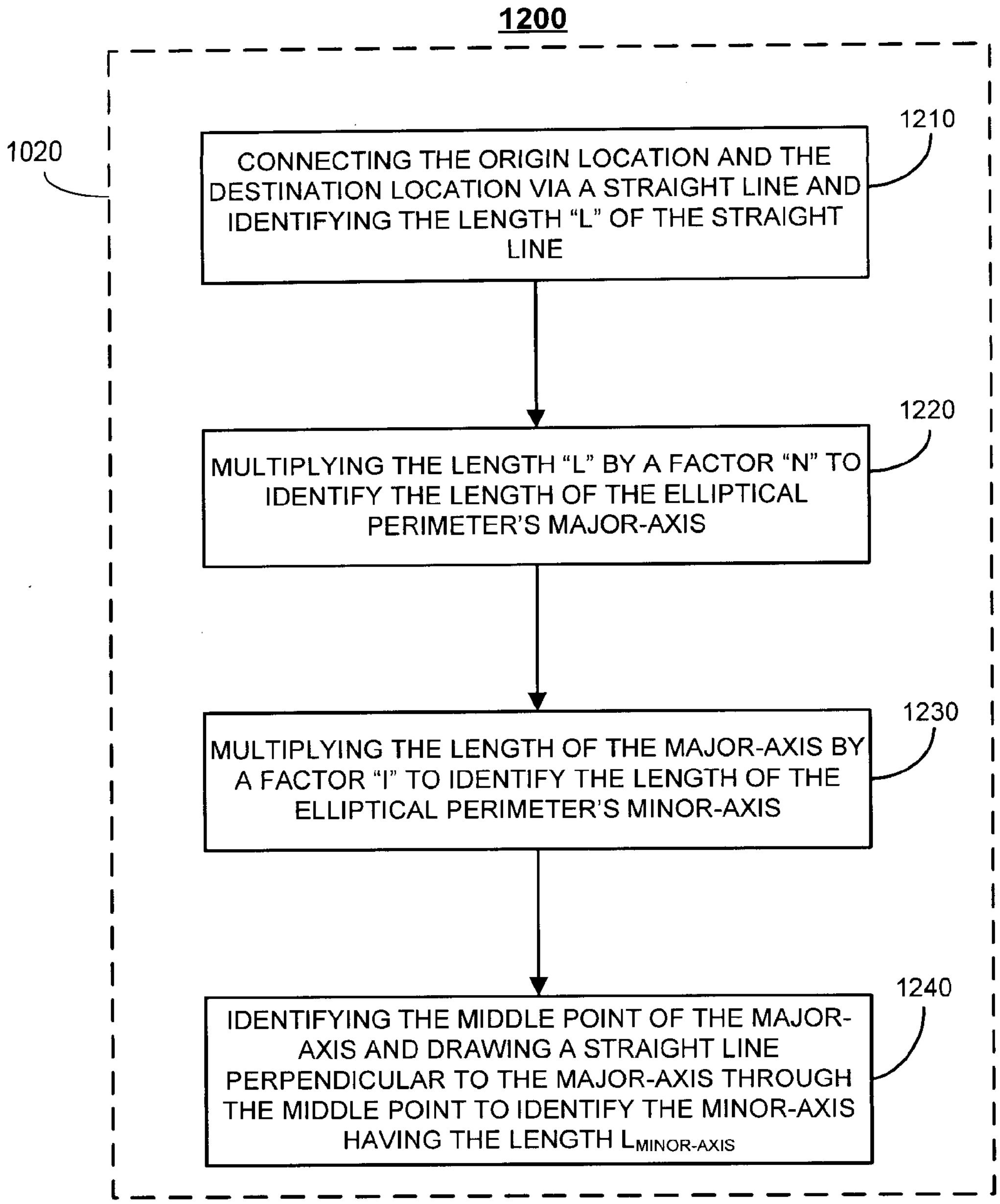

1200
1020
1210
CONNECTING THE ORIGIN LOCATION AND THE DESTINATION LOCATION VIA A STRAIGHT LINE AND IDENTIFYING THE LENGTH "L" OF THE STRAIGHT LINE
1220
MULTIPLYING THE LENGTH "L" BY A FACTOR "N" TO IDENTIFY THE LENGTH OF THE ELLIPTICAL PERIMETER'S MAJOR-AXIS
1230
MULTIPLYING THE LENGTH OF THE MAJOR-AXIS BY A FACTOR "I" TO IDENTIFY THE LENGTH OF THE ELLIPTICAL PERIMETER'S MINOR-AXIS
1240
IDENTIFYING THE MIDDLE POINT OF THE MAJOR-AXIS AND DRAWING A STRAIGHT LINE PERPENDICULAR TO THE MAJOR-AXIS THROUGH THE MIDDLE POINT TO IDENTIFY THE MINOR-AXIS HAVING THE LENGTH $L_{MINOR-AXIS}$

FIG. 12

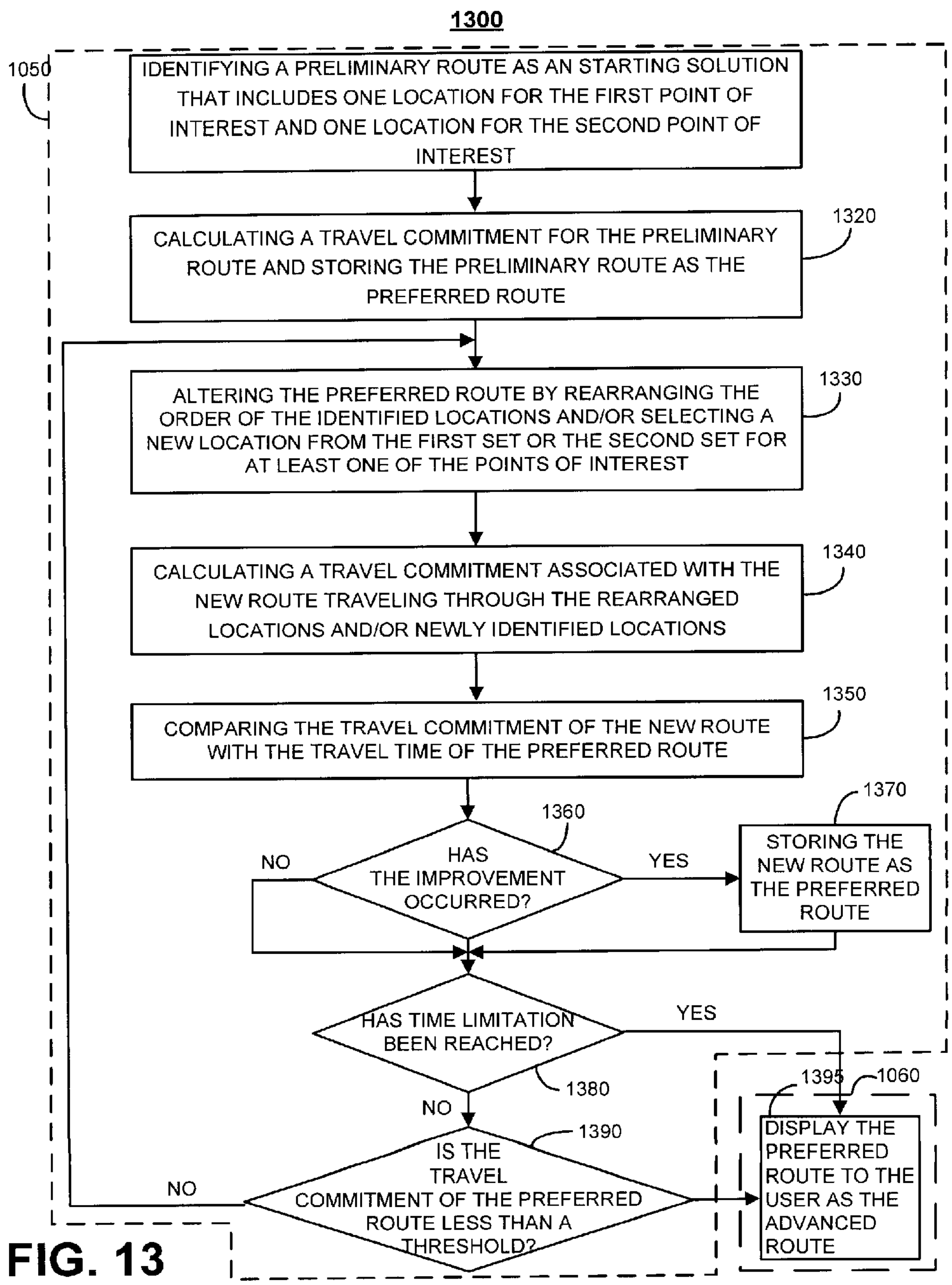

1300
1050
IDENTIFYING A PRELIMINARY ROUTE AS AN STARTING SOLUTION THAT INCLUDES ONE LOCATION FOR THE FIRST POINT OF INTEREST AND ONE LOCATION FOR THE SECOND POINT OF INTEREST
1320
CALCULATING A TRAVEL COMMITMENT FOR THE PRELIMINARY ROUTE AND STORING THE PRELIMINARY ROUTE AS THE PREFERRED ROUTE
1330
ALTERING THE PREFERRED ROUTE BY REARRANGING THE ORDER OF THE IDENTIFIED LOCATIONS AND/OR SELECTING A NEW LOCATION FROM THE FIRST SET OR THE SECOND SET FOR AT LEAST ONE OF THE POINTS OF INTEREST
1340
CALCULATING A TRAVEL COMMITMENT ASSOCIATED WITH THE NEW ROUTE TRAVELING THROUGH THE REARRANGED LOCATIONS AND/OR NEWLY IDENTIFIED LOCATIONS
1350
COMPARING THE TRAVEL COMMITMENT OF THE NEW ROUTE WITH THE TRAVEL TIME OF THE PREFERRED ROUTE
1360
HAS THE IMPROVEMENT OCCURRED?
NO
YES
1370
STORING THE NEW ROUTE AS THE PREFERRED ROUTE
HAS TIME LIMITATION BEEN REACHED?
YES
1380
NO
1390
IS THE TRAVEL COMMITMENT OF THE PREFERRED ROUTE LESS THAN A THRESHOLD?
NO
1395
1060
DISPLAY THE PREFERRED ROUTE TO THE USER AS THE ADVANCED ROUTE

FIG. 13

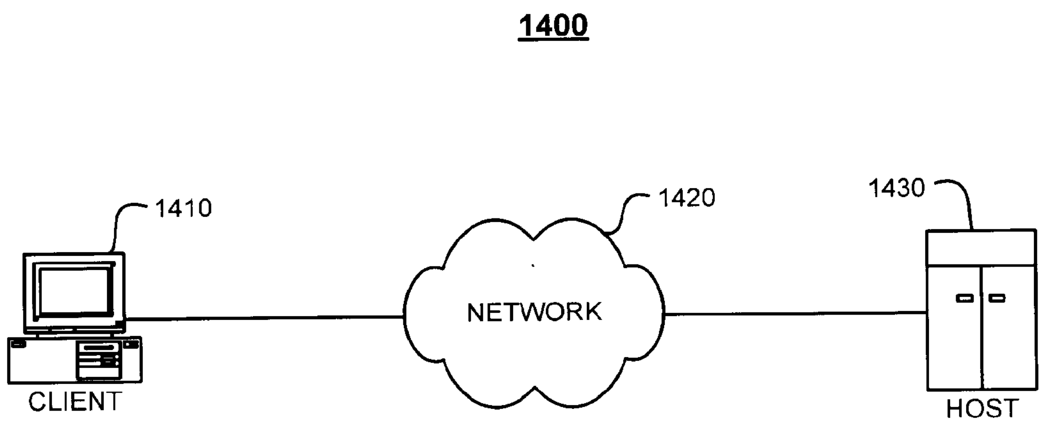


FIG. 14

IDENTIFYING A ROUTE CONFIGURED TO TRAVEL THROUGH MULTIPLE POINTS OF INTEREST

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. application Ser. No. 13/620,597, filed Sep. 14, 2012, which is a continuation of U.S. application Ser. No. 13/037,602, filed Mar. 1, 2011, now issued as U.S. Pat. No. 8,467,959, which is a continuation of U.S. application Ser. No. 11/617,874, filed Dec. 29, 2006, now issued as U.S. Pat. No. 7,920,965, which claims priority from U.S. Provisional Application Ser. No. 60/746,569, filed on May 5, 2006, and from U.S. Provisional Application Ser. No. 60/829,695, filed Oct. 17, 2006. The entire contents of the prior applications are incorporated herein by reference.

TECHNICAL FIELD

[0002] This document relates to identifying a route configured to travel through multiple points of interest.

BACKGROUND

[0003] A traveler may submit to a host a mapping query to request mapping information, such as a suggested route between an origin location and a destination location or driving directions to a destination location from an origin location.

SUMMARY

[0004] According to one general aspect, a computer-implemented method for identifying a route that is configured to travel through multiple points of interest includes receiving a query that includes an origin location, a destination location, and at least a first point of interest and a second point of interest. In response to receiving the query, the method includes identifying a perimeter that surrounds the received origin and destination locations. The method also includes using the identified perimeter as a basis for identifying a first set of potential locations that corresponds to the received first point of interest and that represents less than all potential locations corresponding to the first point of interest. The method also includes using the identified perimeter as a basis for identifying a second set of potential locations that corresponds to the received second point of interest and that represents less than all potential locations corresponding to the second point of interest. The method also includes selecting, from the first and second set of locations, respectively, a single first potential location corresponding to the received first point of interest and a single second potential location corresponding to the received second point of interest. The method also includes displaying, as an advanced route, a route from the origin location to the destination location that travels through the selected single first potential location corresponding to the received first point of interest and the selected single second potential location corresponding to the received second point of interest.

[0005] Implementations of the above general aspect may include one or more of the following features. For example, the first point of interest and the second point of interest may each include an indication of an establishment having multiple locations associated therewith. For another example, identifying the perimeter that surrounds the received origin and destination locations may include identifying an elliptical perimeter.

[0006] Implementations of the above general aspect may also include determining whether each of the first and second points of interest include at least one location within the perimeter and expanding parameters of the perimeter if it is determined that at least one of the first or second point of interest does not include the at least one location within the perimeter. Identifying the perimeter that surrounds the received origin and destination locations may include identifying an elliptical perimeter.

[0007] Selecting the single first potential location corresponding to the received first point of interest and the single second potential location corresponding to the received second point of interest may further include identifying a preliminary route as an starting solution that includes one first location associated with the first point of interest and one second location associated with the second point of interest, wherein the first and second locations are selected from the first and second sets of potential locations, identifying a travel commitment for the preliminary route, storing the preliminary route as a preferred route, altering the preferred route to identify a new route, identifying a travel commitment associated with the new route, comparing the travel commitment associated with the new route with the travel commitment associated with the preferred route, and if the travel commitment associated with the new route is less than the travel commitment associated with preferred route, storing the new route as the preferred route. The travel commitment may include travel time or a travel distance.

[0008] Altering the preferred route to identify the new route may include rearranging the order in which the locations associated with the first and second points of interest are visited in the preferred route. Alternatively or additionally, altering the preferred route to identify the new route may include selecting a new location associated with at least one of the first or second point of interest, and including the newly selected location and at least one location that appears in the preferred route within the new route. Including the newly selected location within the new route may include displacing one of the locations associated with either the first or second point of interest within the preferred route with the newly selected location. The new location may supplement the locations associated with the first and second points of interest within the preferred route. Selecting the new location may include selecting the new location from the first or the second set of potential locations.

[0009] The method may also include determining whether a time limitation has been reached and displaying the preferred route to the user if it is determined that the time limitation has been reached. The time limitation may begin to expire from a time the process of selecting the single first potential location corresponding to the received first point of interest and the single second potential location corresponding to the received second point of interest begins and the time limitation may expire at a pre-defined expiration time; thus, enabling the user to identify the advanced route within a reasonable time frame. The pre-defined expiration time may be defined by the user or a host. The method also may include displaying the new route to the user if it is determined that the travel commitment of the new route is less than the threshold.

[0010] Selecting the single first potential location corresponding to the received first point of interest and the single second potential location corresponding to the received second point of interest may further include identifying co-located locations associated with the first and second points of interest within the first and second sets of potential locations, identifying a route associated with each of the co-located locations, the route configured to travel through the co-located locations, identifying a travel commitment associated with each identified route, and comparing the travel commitment of the identified routes to identify an advanced route with a minimized travel commitment. Identifying co-located locations may include searching, within the second set of potential locations, for a location that appears close to each location appearing in the first set of potential locations, and as a result of the search, identifying one or more co-located locations associated with the first and second points of interest. The co-located locations may include location that appear within a pre-defined time or distance from each other. The travel commitment may include travel time or a travel distance.

[0011] Receiving the query may include receiving multiple keywords each identifying one of the origin location, the destination location, and at least the first point of interest and the second points of interest. Receiving the multiple keywords may include receiving the multiple keywords concurrently. Alternatively or additionally, receiving the multiple keywords may include receiving each one of the multiple keywords at a different time.

[0012] The origin location, the destination location, and the at least first point and the second point of interest forming the query may each be received from a different source.

[0013] According to another general aspect, a computer-implemented method for identifying a route that is configured to travel through multiple points of interest includes receiving a query that includes an origin location, a destination location, and at least a first point of interest and a second point of interest and determining a preliminary route from the origin location to the destination location. The method also includes identifying a first set of potential destinations that corresponds to the received first point of interest and that represents less than all potential destinations corresponding to the first point of interest, the potential destinations within the first set being identified based on a relatedness of the potential destinations to the first point of interest and also based on a geographic proximity of the potential destinations to the determined preliminary route. The method also includes identifying a second set of potential destinations that corresponds to the received second point of interest and that represents less than all potential destinations corresponding to the second point of interest, the potential destinations within the second set being identified based on a relatedness of the potential destinations to the second point of interest and also based on a geographic proximity of the potential destinations to the determined preliminary route. The method also includes selecting, among the first and second sets of potential destinations identified, respectively, a single first potential destination corresponding to the received first point of interest and a single second potential destination corresponding to the received second point of interest. The method also includes displaying, as an advanced route, a route from the origin location to the destination location through the selected single first potential destination corresponding to the received first point of interest and the selected single second potential destination corresponding to the received second point of interest.

[0014] Implementations of the above general aspect may include one or more of the following features. For example, identifying the first and the second sets of potential destinations based on the geographic proximity of the potential destinations to the preliminary route may include identifying the first and the second sets of potential destinations based on distance along roads from the preliminary route to the potential destinations. Alternatively or additionally, identifying the first and the second sets of potential destinations based on the geographic proximity of the potential destinations to the preliminary route may include identifying the first and the second sets of potential destinations based on estimated time of travel from the preliminary route to the potential destinations. Identifying the first set of potential destinations may include identifying the first set of potential destinations representing at least multiple locations for the received first point of interest.

[0015] Selecting the single first and second potential locations may further include identifying a preliminary route as an starting solution that includes one first potential destination associated with the first point of interest and one second potential destination associated with the second point of interest, wherein the first and second potential destinations are selected from the first and second sets of potential destinations, identifying a travel commitment associated with the preliminary route, storing the preliminary route as a preferred route, altering the preferred route to identify a new route, comparing the travel commitment associated with the new route with the travel commitment associated with the preliminary route, and if the travel commitment associated with the new route is less than the travel commitment associated with the preferred route, storing the new route as the preferred route. The travel commitment may include travel time or a travel distance.

[0016] Altering the preferred route to identify the new route may include rearranging the order in which the destinations associated with the first and second points of interest are visited in the preferred route. Alternatively or additionally, altering the preferred route to identify the new route may include selecting a new destination associated with at least one of the first or second point of interest, and including the newly selected destination and at least one destination that appears in the preferred route within the new route. Including the newly selected destination within the new route may include displacing one of the destinations associated with either the first or second point of interest within the preferred route with the newly selected destination. The new destination may supplement the destinations associated with the first and second points of interest within the preferred route.

The method also may include identifying a perimeter around the preliminary route and using the identified perimeter as a basis for identifying the first and second sets of potential destinations. Identifying the perimeter may include identifying a perimeter that has an elliptical shape. The method also may include determining that at least one of the first and second points of interest does not include a location within the first perimeter, identifying a second perimeter formed around and outside of the first perimeter, and identifying a set of locations for the at least one of the first and second points of interest that is within the second perimeter.

[0017] According to another general aspect, a computer-implemented method for identifying a route that is configured to travel through multiple points of interest includes receiving a query that includes an origin location, a destination location, and at least a first point of interest and a second point of interest and identifying a first location associated with the first point of interest and a second location associated with the second point of interest. The method also includes displaying, as a first advanced route, a route from the origin location to the destination location that travels through the identified first location associated with the first point of interest and the identified second location associated with the second point of interest. The method also includes identifying a different first location associated with the first point of interest and a different second location associated with the second point of interest and displaying, as a second advanced route, a route from the origin location to the destination location that travels through the identified different first location associated with the first point of interest and the identified different second location associated with the second point of interest. The method also includes enabling a user to select from among the first and second identified advanced routes.

[0018] Implementations of the above general aspect may include one or more of the following features. For example, the first advanced route and the second advanced route may be displayed concurrently.

[0019] For another example, identifying the first location and the second location may further include determining a preliminary route from the origin location to the destination location, identifying a first set of potential locations that corresponds to the received first point of interest and that represents less than all potential locations corresponding to the first point of interest, the potential locations within the first set being identified based on a relatedness of the potential locations to the first point of interest and also based on a geographic proximity of the potential locations to the determined preliminary route, identifying a second set of potential locations that corresponds to the received second point of interest and that represents less than all potential locations corresponding to the second point of interest, the potential locations within the second set being identified based on a relatedness of the potential locations to the second point of interest and also based on a geographic proximity of the potential locations to the determined preliminary route, and, among the first and second sets of potential destinations identified, respectively, selecting the first location and the second location.

[0020] Identifying the first different location and the second different location may further include selecting from among the first and second sets of potential destinations identified, respectively the first different location and the second different location. Locations associated with the first and second points of interest may include geographic locations or addresses. Alternatively or additionally, locations associated with the first and second points of interest may include facility names of the first and second points of interest. The first and second points of interest may include first and second establishments, respectively, wherein the first and second establishment each may include one or more locations associated therewith. Alternatively or additionally, the first and second points of interest may include first and second facility names, respectively. Alternatively or additionally, the first and second points of interest may include first and second desired objects, respectively, in which the user is interested. Alternatively or additionally, the first and second desired objects may include objects associated with a particular activity.

[0021] The first and second establishments may each be associated with a particular location. The particular location may include a geographical location. The particular location associated with the first establishment may include a particular geographical location and the particular location associated with the second establishment includes a particular facility name.

[0022] The method also may include identifying that the first advanced route is selected by the user, and in response to the user selecting the first advanced route, providing the user with point-to-point directions/maps for the first advanced route. The point-to-point directions/maps may begin at the origin location, pass through the first and second locations associated with the first and second points of interest, respectively, and end at the destination location. The origin location and the destination location may each include a geographical location. The origin location may include a geographical location and the destination location may include a facility name.

[0023] Implementations of the described techniques may include hardware, a method or process, or computer software on a computer-accessible medium.

[0024] The details of one or more implementations are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

[0025] FIG. **1** illustrates a flow chart of an exemplary process a host may use to identify an advanced route between an origin location and a destination location, such that the advanced route includes a location for each of user-identified multiple points of interest.

[0026] FIG. **2**A illustrates an exemplary user interface provided to a user of a client device wishing to visit multiple points of interest along a route from an origin location to a destination location.

[0027] FIG. **2**B illustrates an exemplary user interface for entering information about a particular stop.

[0028] FIG. **3** illustrates a map that is used to identify a set of locations corresponding to each of user-identified multiple points of interest.

[0029] FIG. **4** illustrates a flow chart of an exemplary process a host may use to identify the elliptical perimeter around the preliminary route illustrated by FIG. **3**.

[0030] FIG. **5**A illustrates an exemplary table that a host may use to identify an advanced route having a minimized travel commitment.

[0031] FIG. **5**B illustrates an exemplary table in which the host rearranges the locations included in the advanced route identified in FIG. **5**A to reduce the travel commitment associated with the advanced route.

[0032] FIGS. **6**A-**6**B illustrate an exemplary process and an exemplary table a host may use to identify the most efficient route associated with selected locations for multiple points of interest.

[0033] FIGS. **7**A-**7**B illustrate an exemplary process and an exemplary table a host may use to identify an advanced route having the "least" travel commitment.

[0034] FIG. **8**A illustrates an exemplary process a host may use to enable a user to identify an advanced route based on user-selected locations for the multiple points of interest.

[0035] FIG. **8**B illustrates an exemplary process a host may use for applying more weight to user-selected locations for the multiple points of interest.

[0036] FIGS. **9**A-**9**B illustrate exemplary user interfaces each displaying multiple routes responsive to a search query, and thus enabling the user to select from among the displayed multiple routes.

[0037] FIG. **10** illustrates another exemplary process that a host uses to identify an advanced route between an origin location and a destination location.

[0038] FIG. **11** illustrates an elliptical perimeter that a host uses to search for potential locations for each of user-defined multiple points of interest.

[0039] FIG. **12** illustrates a process the host uses to identify the elliptical perimeter illustrated in FIG. **11**.

[0040] FIG. **13** illustrates an exemplary process a host uses to select a single location for each of user-identified multiple points of interest.

[0041] FIG. **14** illustrates a communication system, enabling a host to solicit from a client device a search query and to generate a response to the search query.

DETAILED DESCRIPTION

[0042] A user of a client device may wish to travel from an origin location to a destination location, and the user may wish to visit multiple points of interest along the way. For example, the user may wish to visit a convenient automated teller machine ("ATM"), a grocery store, a gas station, and a dry cleaner along a commuting route or a planned vacation route. As such, the user may benefit from an advanced route that includes and thus encourages travel through a convenient location for each of the user-identified multiple points of interest. Accordingly, techniques are provided for generating such an advanced route that includes a location for each of the user-identified multiple points of interest. In one implementation, the techniques described in this application enable a host to generate the advanced route without excessive computational delay.

[0043] An exemplary process **100** of FIG. **1** may be used by a host to identify an advanced route between an origin location and a destination location, such that the advanced route includes and thus encourages travel through a location for each of user-identified multiple points of interest. Below, process **100** is described with brief reference to other illustrative figures, each of which are later described separately. Process **100** begins by providing a client device with access to the host (**110**). Providing the client device access to the host may include providing the client device with a user interface, such as that of FIGS. **2**A and **2**B, for submitting a search query to the host.

[0044] The host receives the search query, including an origin location, a destination location, and an indication of multiple points of interest (**120**). The multiple points of interest may include intermediary services, such as banking services, dry cleaning services, flower shop services, grocery store services, and/or gas stations services. The host may receive the search query via, for example, a request and/or message from the client device.

[0045] In response to the search query, the host identifies a preliminary route between the origin location and the destination location (**130**). FIG. **3** illustrates a preliminary route **310** the host may identify between the origin location and the destination location. The host identifies a perimeter around the preliminary route (**140**). The host may use an exemplary process **400** described with respect to FIG. **4** to identify the perimeter around the preliminary route. As shown in FIG. **3**, the perimeter **320** includes an elliptical shape and is formed around the preliminary route **310**. The host identifies, within the elliptical perimeter, a set of locations corresponding to each of the received multiple points of interest (**150**). The set of locations may include a set of geographic locations or addresses. Alternatively or additionally, the set of locations may include a set of zip codes, street addresses and/or facility names.

[0046] In one example and as shown in FIG. **3**, where the multiple points of interest include a gas station, a grocery store, and a restaurant, the host identifies a set of locations within the elliptical route **320** that correspond to the gas station, a set of locations corresponding to the grocery store, and a set of locations corresponding to the restaurant. The host selects, from the set of locations identified, a location corresponding to each of the user-identified multiple points of interest for which the set of locations was identified (**160**). In keeping with the example of FIG. **3**, the host selects, from the set of locations identified, a location for the gas station, a location for the grocery store, and a location for the restaurant, for example, using tables and processes described with respect to FIGS. **5**A-**5**B and **6**A-**6**B. Based on this selection, the host identifies an advanced route between the origin location and the destination location, where the advanced route includes and thus encourages travel through the selected location for each of the user-identified multiple points of interest (**170**). Again keeping with the example of FIG. **3**, process **100** thus resolves an advanced route that includes a location for the gas station, the grocery store, and the restaurant.

[0047] More specifically, FIG. **2**A illustrates an exemplary user interface ("UI") **200**A provided to a user of a client device, wishing to visit multiple points of interest along a route from an origin location to a destination location. The UI **200**A may be displayed, for example, on an in-vehicle navigation system, a mobile device, such as a cellular phone or PDA, or other devices, such as a personal computer.

[0048] The UI **200**A includes an origin selection portion **210**, a destination selection portion **220**, a points of interest selection portion **230**, an identify stops portion **240**, and a directions/maps selection portion **250**. The origin selection portion **210** enables the host to solicit or otherwise receive an origin or a starting location. The origin selection portion **210** includes fields enabling specification of an address or an intersection, a city, a state, and a zip code. The destination selection portion **220** enables the host to solicit or otherwise receive a destination location. The destination selection portion **220** includes fields enabling specification of a destination name, an address or an intersection, a city, a state, and a zip code.

[0049] The UT **200**A also includes the points of interest selection portion **230**. The points of interest selection portion **230** enables the host to solicit or otherwise receive multiple points of interest that the user wishes to visit along a route between the origin location and the destination location. The points of interest selection portion **230** includes a user selectable option for identifying each of the multiple points of interest. The multiple points of interest may include banking services, restaurant services, flower shop services, and/or "other" services or places, such as gas stations, shopping centers, and/or grocery stores. In one implementation, shown in FIG. **2**A, the user may communicate to the host a desired point of interest by selecting a box corresponding to that point of interest.

[0050] A representation of a point of interest in UI **200**A may be interactive. For example, the user may interact with the point of interest by selecting the point of interest in the UI **200**A (e.g., double clicking on the point of interest using, for example, a mouse). Selecting the point of interest may launch another UI, enabling the user to provide additional information regarding the point of interest to the host. For instance, selecting "banking services" may launch another UI, enabling the user to identify the type of banking services in which the user is interested (e.g., a type of branch and/or ATM services).

[0051] The UI **200**A also includes the identify stops portion **240**. The identify stops portion **240** enables the host to solicit or otherwise identify particular stops along the route. When the user selects the identify stops portion **240**, a UI for entering information about a particular stop (e.g., UI **240** of FIG. **2**B) is displayed. For example, the identify stops portion **240** may enable the user to identify an address of the particular stops. Alternatively or additionally, the identify stops portion **240** may enable the user to specify a name of a particular stop and/or geographical area in which particular stop is located. For example, the identify stops portion **240** may enable the user to specify a favorite banking service in a particular area (e.g. Bank of America in the NW quadrant of Washington D.C.). Similarly, the identify stops portion **240** may enable the user to specify a name of a particular restaurant in which the user is interested.

[0052] FIG. **2**B illustrates an exemplary UI **240** for entering information about a particular stop. The UI **240** includes a first stop selection portion **240**A and "other" stops selection portion **240**B. The first stop selection portion **240**A includes fields enabling specification of a destination name, an address or an intersection, a city, a state, a zip code, and a category name. The category name field indicates the category or type of stop, such as gas, cash, or restaurant. The "other" stops selection portion **240**B enables the user to provide additional particular stops to the host.

[0053] Referring again to FIG. **2**A, the UI **200**A also includes the directions/maps selection portion **250**. The directions/maps selection portion **250** enables the user to receive directions/maps between the origin location and the destination location through the location associated with the user-identified multiple points of interest.

[0054] FIG. **3** illustrates a map **300** that is used to identify a set of locations corresponding to each of the user-identified multiple points of interest. The map **300** includes an origin location, a destination location, and a preliminary route **310** between the origin location and the destination location. The map **300** also includes a perimeter **320** that has an elliptical shape and that is formed around the preliminary route **310**. The elliptical perimeter **320** is used to identify a set of locations corresponding to each of the received multiple points of interest. Using the elliptical perimeter **320** to identify a set of locations corresponding to each of the multiple points of interest may increase the efficiency in identifying an advanced route traveling through the user-identified multiple points of interest.

[0055] FIG. **4** illustrates a flow chart of an exemplary process **400** a host may use to identify or otherwise calculate the elliptical perimeter **320** around the preliminary route **310** illustrated by FIG. **3**. The process **400** illustrates in more detail the blocks **130**, **140**, and **150** associated with the process **100** described above with respect to FIG. **1**. Initially, the host identifies the preliminary route **310** between the origin location and the destination location (**410**). The host may identify the preliminary route **310** by referencing an internal server, which in turn references roads, coupling the origin location to the destination location. Alternatively, the host may identify the preliminary route **310** by referencing an external server, such as a web map server (e.g., Mapquest™) that employs one or more geocoding servers, mapping servers, and/or routing servers to generate the preliminary route **310**. Upon identification of the preliminary route **310**, the host may identify locations (e.g., latitude/longitude coordinates) that are at a certain distance "d" from points along the preliminary route **310** (or map tiles/sectors corresponding thereto) (**420**). In one implementation, the host selects the distance "d." In another implementation, the user selects the distance "d." Once the locations at the distance "d" along the preliminary route **310** are identified, the host connects these locations (as presented by broken lines in FIG. **3**) to form a first perimeter **320** around the preliminary route **310**, which may include an elliptical shape as shown in FIG. **3** (**430**).

[0056] The host uses the elliptical perimeter **320** to identify a subset from among the universe of locations otherwise corresponding to each of the user-identified multiple points of interest. The host first determines whether the elliptical perimeter **320** includes at least one location for each of the user-identified multiple points of interest (**440**). If so (e.g., all of the user-identified multiple points of interest are represented within the elliptical perimeter **320**, the host identifies, within the elliptical perimeter **320**), a set of locations for each of the user-identified multiple points of interest (**460**). For example and referring again to FIG. **3**, when the search query includes identifying a gas station, a grocery store, and a restaurant along the route, the host may identify within the elliptical perimeter **320** a set of locations for the gas station, a set of locations for the grocery store, and a set of locations for the restaurant. As shown in FIG. **3**, the set of locations for the gas station includes three different locations for a "Brand" gas station; the set of locations for the restaurant includes three different locations for McDonald's™; and the set of locations for the grocery store includes three different locations for Safeway™.

[0057] If the host fails to identify, within the elliptical perimeter **320**, a location associated with at least one of the multiple points of interest, the host calculates a second perimeter (**450**). The second perimeter may include an elliptical shape and may be calculated in the same manner as the elliptical perimeter **320**, however, the second perimeter may include a larger distance "d" from the points along the preliminary route **310**. As such, the second perimeter may be larger than the elliptical perimeter **320** and may surround the elliptical perimeter **320**. Upon calculating the second perimeter, the host again determines whether all the user-identified multiple points of interest are represented within the second perimeter (**440**). If so, the host identifies, within the second perimeter, a set of locations for the at least one of the multiple points of interest (**460**).

[0058] The host selects, from each set of locations identified, a location corresponding to each of the multiple points of interest for which the set of locations was identified. The host uses the selected locations to identify an advanced route that includes and thus encourage travel through the selected location for the multiple points of interest. In one example and as described below with respect to FIGS. **5**A-**5**B, the host identifies multiple advanced routes by selecting, from each set of locations, multiple locations corresponding to each of the multiple points of interest. The host calculates the travel commitment that includes travel time and/or travel distance for each of the multiple advanced routes and selects the advance route for which the travel commitment is minimized.

[0059] FIG. **5**A illustrates an exemplary table **500**A that a host may use to identify an advanced route having a minimized travel commitment. Table **500**A includes type of interest column **510**, closest choices column **520**, next closest choices column **530**, and next closest choices column **540**. The type of interest column **510** identifies the type of interest, which includes categories for a gas station, a restaurant, and a grocery store. The closest choices column **520**, the next closest choices column **530**, and the next closest choices column **540** each represent different advanced routes that include a location corresponding to each of the multiple points of interest. The location includes an address and a travel distance of the type of interest from the preliminary route **310**.

[0060] Table **500**A also includes a travel time row **550** and a travel distance row **560**. The travel time row **550** identifies the travel time for the advanced route in the closest choices column **520**, the next closest choices column **530**, and the next closest choices column **540**. The travel distance row **560** identifies the travel distance for the advanced route in the closest choices column **520**, the next closest choices column **530**, and the next closest choices column **540**. The host may be configured to use the travel time row **550** and/or the travel distance row **560** to identify an advanced route having the minimized travel commitment. As shown in FIG. **5**A, the advanced route having the minimized travel commitment appears in the closest choices column **520**.

[0061] In one implementation, the closest choices column **520**, the next closest choices column **530**, and the next closest choices column **540** may represent a set of locations. For example, the closest choices column **520** may represent a first set of locations. The next closest choices column **530** may represent a second set of locations. And, the next closest choices column **530** may represent a third set of locations. Each set of locations includes at least one location for each of the types of interest. The host may rearrange the order in which the locations within each set of locations are visited to determine whether the travel commitment can be further reduced. FIG. **5**B illustrates an exemplary table **500**B, representing the host rearrangement of the locations within the first set, the second set, and the third set of locations. For example, as shown in FIG. **5**B, the host rearranges the locations within the first set such that the McDonald's™ at 555 Tuckerman Lane, Potomac, Md. is visited first, the Bp™ gas station at 1210 Seven Lock Rd., Potomac, Md. is visited second, and the Safeway™ at 1213 Seven Lock Rd., Potomac, Md. is visited third. The host may continue this process for each set of location or a selected set of locations to identity the most efficient route within each set of locations or the selected set of locations in table **500**A. In either case, as the host rearranges the locations within the set of locations, the travel time and the travel distance associated with the advanced route including the rearranged locations may change. For example, as shown in FIG. **5**B, the travel time and the travel distance associated with the advanced routes identified in table **500**B is less than the travel time and the travel distance associated with the advanced routes identified in table **500**A.

[0062] Below, FIGS. **6**A-**6**B illustrate an exemplary process **600**A and an exemplary table **600**B that a host uses to identify the most efficient route for a selected set of locations in table **500**A, and FIGS. **7**A-**7**B illustrate an exemplary process **700**A and an exemplary table **700**B that a host may use to identify the most efficient route within each set of locations identified in table **500**A.

[0063] FIG. **6**A illustrates an exemplary process **600**A a host may use to identify the most efficient route within a selected set of locations. The process **600**A illustrates in more detail the blocks **160** and **170** associated with the process **100** described above with respect to FIG. **1**. Initially, the host selects a set of locations that includes at least one location for each of the multiple points of interest (**610**). For example, the host may select the first set of locations (e.g., the closest choices column **520** of FIG. **5**A) resulting in the minimized travel commitment. The host rearranges the order of the locations within the selected set of locations to identify alternative routes traveling through those locations (**620**). The host calculates a travel time and/or a travel distance for each of the identified alternative routes (**630**) and identifies a route having a minimum travel time and/or travel distance among the identified alternative routes (**640**). To identify a route having the minimum travel time and/or travel distance, the host may use an exemplary table **600**B, shown in FIG. **6**B. In table **600**B, the host identifies the alternative routes within the selected set of locations (e.g., the closes choices column **520** of FIG. **5**A) and also identifies the travel time and the travel distance corresponding to each of the alternative routes.

[0064] As shown in FIG. **6**B, the host rearranges the order in which locations within the first set (e.g., the closest choices column **520** of FIG. **5**A) are visited and identifies three alternative routes in addition to the route shown in the closest choices column **520**. The three alternative routes include a first route **660**, a second route **670**, and a third route **680**. Each of the alternative routes **660**, **670**, and **680** include a different order in which the location for the each of the multiple points of interest is visited. For example, in the first route **660**, the location for the restaurant is visited first, the location for the gas station is visited second, and the location for the grocery store is visited third. Similarly, in the second route **670**, the location for the restaurant is visited first, the location for the grocery store is visited second, and the location for the gas station is visited third.

[0065] Table **600**B also includes a travel time row **690**A and a travel distance row **690**B. The travel time row **690**A includes a travel time for each of the alternative routes. The travel distance row **690**B includes a travel distance for each of the alternative routes. The host compares the travel time and/or the travel distance for each of the four alternative routes (e.g., a route identified in closest choices column **520** of FIG. **5**A and the three routes identified in table **600**B) to identify the route with minimum travel time and/or the travel distance. As shown, the route with the minimum travel time and/or distance includes the first route **660** with a travel time of 44 minutes and a travel distance of 24.8 miles. Once the host identifies the route having the minimum travel time and/or travel distance among the alternative routes (**640**), the host presents the route to the user as the most efficient route within the selected set of locations (**650**).

[0066] FIGS. **7**A-**7**B illustrate an exemplary process **700**A and an exemplary table **700**B that a host may use to identify the advanced route having the "lowest" travel time and/or the travel distance. Referring specifically to FIG. **7**A, the process **700**A illustrates in more detail the blocks **160** and **170** associated with the process **100** described above with respect to FIG. **1**. The process **700**A begins by the host rearranging, within each set of locations identified in table **500**A (e.g., the closest choices column **520** and the next closest choices columns **530** and **540**), the order of locations to identify alternative routes traveling through those locations (**710**). The host calculates, within each set of locations identified in table **500**A, a travel time and/or a travel distance for each identified alternative routes (**720**), and identifies, within each set of locations, a most efficient route having the minimum travel time and/or travel distance among the alternative routes (**730**). The host may use the operation described above with respect to FIG. **6**A to identify the most efficient route within each set of locations identified in table **500**A. The host compares the travel time and/or the travel distance associated with the most efficient routes identified to each other (**740**). To perform this comparison, the host may use the exemplary table **700**B that includes the travel time and the travel distance for the most efficient route within each set of locations. Table **700**B includes a travel time row **740** and a distance row **750**. The travel time row **740** identifies the travel time for the most efficient route within each set of locations. For example, the travel time for the most efficient route within the first set of locations is 44 minutes, within the second set of locations is 43 minutes, and within the third set of locations is 55 minutes.

[0067] The distance row **750** identifies the travel distance for the most efficient route within each set of locations. For example, the travel distance for the most efficient route within the first set of locations is 24.8 miles, within the second set of locations is 25 miles, and within the third set of locations is 30 miles. The host may use table **700**B to identify and select the most efficient route with the "lowest" travel commitment, as the advanced route (**750**).

[0068] In one scenario, shown in FIG. **7**B, one of the routes may have the shortest travel time and another route may have the shortest travel distance. For example, the most efficient route within the first set has the shortest travel distance and the most efficient route within the second set has the shortest travel time. In this scenario, the host may be configured to use the route with the shortest travel time as the advanced route. Alternatively, the host may be configured to use the route with the shortest travel distance as the advanced route.

[0069] FIG. **8**A illustrates an exemplary process **800**A the host uses to enable the user to identify an advanced route based on the user-selected locations for the multiple points of interest. Initially, the host presents to the user a set of locations corresponding to each of the multiple points of interest (**810**). In one implementation and referring again to FIG. **5**A, the host may present to the user table **500**A as a UI, enabling the user to select, from the set of locations, a location corresponding to each of the multiple points of interest (**820**). The user may select a location for each of the multiple points of interest by "clicking on," for example, the locations appearing in the closest choices column **520**, the next closest choices column **530**, and/or the next closest choices column **540**. For example, the user may select a location for a gas station from the closest choices column **520** by selecting the "1210 Seven Lock Rd. Potomac, Md." icon. And, the user may select a location for the restaurant from the next closest choices column **530** by selecting the "555 Tuckerman Lane, Potomac, Md." icon. Similarly, the user may select a location for the grocery store from the closest choices column **520** by selecting "1213 Seven Lock Rd, Potomac, Md." icon. In response, the host identifies an advanced route based on the user-selected locations (**830**). The host may optionally present the advanced route to the user (**840**). The host also may present to the user alternatives to the user's selected route, enabling the user to compare the travel commitment of the selected route with the travel commitment of the other routes and to make an informed decision about which route the user wishes to travel. The alternatives may include substituted points of interest and/or it may rearrange an order of travel among points of interest.

[0070] Alternatively and prior to presenting the user-identified advanced route to the user (**840**), the host may perform a preliminary analysis on the user-identified advanced route. For example, the host may give the user-identified advanced route more weight than other alternative routes presented in the UI **500**A, and the host may select the user-identified advanced route if its travel commitment is less than a threshold value. FIG. **8**B illustrates an exemplary process **800**B that a host uses for applying more weight to the user-identified advanced route and selecting the user-identified advanced route if its travel commitment is less than a threshold value. Initially, the host calculates a travel commitment for the advanced route (**850**). The host reduces the travel commitment by a certain value to identify a new travel commitment for the advanced route (**860**). The host determines whether the new travel commitment is less than the threshold value (**870**). If so, then the host presents the advanced route to the user (**880**). Otherwise, the host determines whether one of the alternative routes presented in the UI **500**A has a travel commitment less than the travel commitment of the user-identified advanced route (**890**). If so, then the host presents the alternative route to the user (**892**). If not, then the host presents the user-selected route to the user (**894**).

[0071] FIG. **9**A illustrates an exemplary UI **900**A that displays multiple routes responsive to a search query, and that enables the user to select from among the displayed multiple routes. The UI **900**A represents a message that may be presented to the user who is traveling from "1425 K St. NW, Washington, D.C. 20005" toward the "United States Patent and Trademark Office" ("USPTO"), and who seeks a route that enables the user to stop by "a gas station" and "a grocery store."

[0072] As shown in FIG. **9**A and described above, the UI **900**A notes the origin location, the destination location, and the multiple points of interest the user has previously specified via, for example, the UI **200**A. The UI **900**A communicates to the user multiple routes that are responsive to the search query. The multiple routes may include, for example, a Route A and a Route B. Route A has total travel time of 45 minutes and begins at the origin location and travels first through the grocery store location and then the gas station location before reaching the destination of the USPTO.

[0073] In contrast to Route A, Route B has total travel time of 60 minutes and begins at the origin location and travels first through the gas station location and then the grocery store location before reaching the destination of the USPTO. As shown, the locations associated with the gas station and the grocery store appearing in Route B are different from the locations associated with the gas station and the grocery store appearing in Route A. The user may select either Route A or Route B by selecting the box corresponding to Route A or Route B. Upon choosing Route A or Route B, the host may provide point-to-point directions/maps to the user for Route A or Route B, accordingly. In a different implementation, the user selects both Route A and Route B to, for example, view a more detailed map associated with each before selecting either Route A or Route B. In such a scenario, the host generates another UI, such as, for example, the UI **900**B illustrated by FIG. **9**B to graphically illustrate the two competing routes to the user. The UI **900**B includes a graphical representation of Route A and Route B. As shown, Route A passes through different locations associated with the gas station and the grocery store than Route B and appears to have less travel time and/or travel distance associated with it. Upon viewing the graphical representation of the two competing routes, the user may be able to easily make a decision regarding which route to take and upon making such determination, the user may return to UI **900** to make the user's selection.

[0074] In a slightly different scenario, the UI **900**B may be configured to be interactive and the user may select the desired route by clicking on the graphical representation of Route A or Route B. Similarly and referring again to FIG. **9**A, the UI **900**A also may be configured to be interactive. For example, the UI **900**A may enable the user to change the origin location, the destination location, and the multiple points of interest previously specified by the user. The user may select the address associated with those locations to change and/or modify them. Similarly, if the user wishes to visit a point of interest at a specific location, the user may modify the host-suggested location for the point of interest by changing the address for that point of interest.

[0075] In another implementation, unlike the process **100** shown in FIG. **1**, the host identifies an advanced route traveling through each of the identified points of interest without identifying a preliminary route (**130**) and without identifying a perimeter around the preliminary route (**140**). Instead, the host identifies a perimeter around the origin location and the destination location. In particular, after receiving the origin location and the destination location from the client device, the host identifies a perimeter that surrounds the origin location and the destination location, and within the perimeter, the host identifies a set of locations associated with each of the points of interests. For example, as shown in FIG. **11** and further described below, in one implementation, the host identifies a perimeter having an elliptical shape surrounding the origin location and the destination location and identifies, within the elliptical perimeter, a set of locations for each of the points of interest. A point of interest may refer to an establishment that includes multiple locations associated therewith. For example, the point of interest may refer to any gas station and/or a brand gas station at different locations.

[0076] One example will be described to illustrate how the host may identify an advanced route traveling through a location associated each of the multiple points of interest without necessarily computing a preliminary route and forming the elliptical perimeter around the preliminary route. In this example, the user seeks to visit multiple points of interest on a route between an origin location and a destination location. The multiple points of interest include a gas station and a grocery store. The host identifies an elliptical perimeter around the origin location and the destination location, and within the elliptical perimeter, the host identifies a set of locations for the gas station and a set of locations for the grocery store. Before identifying the advanced route, the host identifies a preliminary route as a starting solution. The preliminary route begins at the origin location and is configured to pass through the first location appearing in each set before reaching the destination location. The host determines a travel commitment (e.g., travel time and/or a travel distance) for the preliminary route. Then, the host identifies another route by altering the order in which the previously selected locations for each of the multiple points of interest are visited. Additionally or alternatively, the host identifies another route by choosing from each set a different location for some or all of the multiple points of interest. The host determines the travel commitment for the new route and compares the travel commitment of the new route to the travel commitment of the preliminary route. If improvement in the travel commitment has occurred (e.g., the travel time and/or the travel distance is further minimized), the host uses the new route as the preferred route. If the improvement in the travel commitment has not occurred (e.g., the travel time and/or the travel distance is not further minimized), the host uses the preliminary route as the preferred route.

[0077] The host continues these operations for a specified number of times until all locations within each set have been considered, a time limitation has been reached, or a relative improvement in each iteration is marginal. Using the time limitation may enable the host to identify an advanced route in a timely manner.

[0078] An exemplary process **1000** illustrated by FIG. **10**, may be used by the host to identify an advanced route based on the above-described example. Below, process **1000** is described with brief reference to other processes illustrated by figures, each of which is later described separately. Process **1000** begins with receiving a query that includes an origin location, a destination location, and at least a first point of interest and a second point of interest (**1010**). The first and/or second points of interest may refer to an establishment that includes at least multiple locations associated therewith. In keeping with the above-described example, the first point of interest includes a gas station and the second point of interest includes a grocery store for purposes of this description. The host receives the query via, for example, a request and/or message from the client device through UI **200** shown in FIG. **2**A.

[0079] In response to receiving the query, the host identifies a perimeter that surrounds the received origin and destination locations (**1020**). As shown in FIG. **11**, the perimeter may include an elliptical perimeter **1110** surrounding the origin and destination locations. In another implementation, the perimeter may include other patterns such as, for example, square, rectangular, circular, and/or non-geometric patterns. The host may use an exemplary process **1200** described with respect to FIG. **12** to identify the elliptical perimeter **1110**.

[0080] The host identifies, within the perimeter, a first set of potential locations that corresponds to the received first point of interest, the first set of potential locations representing a subset of all potential locations corresponding to the first point of interest (**1030**). The host also identifies, within the perimeter, a second set of potential locations that corresponds to the received second point of interest, the second set of potential locations representing a subset of all potential locations corresponding to the second point of interest (**1040**). The host selects, from the first and the second sets of potential locations, a single potential location corresponding to the received first point of interest and a single potential location corresponding to the received second point of interest (**1050**). In keeping with the above described example, the host selects, from each set, a location for the gas station and the grocery store, using an exemplary process **1300** described with respect to FIG. **13**. The host then displays, as an advanced route, a route from the origin location to the destination location that travels through the selected single potential location corresponding to the received first point of interest and the selected single potential location corresponding to the received second point of interest (**1060**). Again, keeping with the above-described example, the process **1000** resolves an advanced route that includes a location for the gas station and the grocery store.

[0081] A search area **1100**, such as that illustrated by FIG. **11**, includes an exemplary perimeter that the host may use to search for the potential locations for each of the received first and second points of interest. The search area **1100** includes an origin location, a destination location, and an elliptical perimeter **1110**. The elliptical perimeter **1110** includes a major-axis and a minor-axis, and is rotated with respect to the longitudinal axis by a rotation angle θ. The rotation angle θ may be found by a vector in latitude and longitude space from origin location to the destination location.

$$\theta=\tan^{-1}(d\mathrm{lat}/d\mathrm{lng}) \quad \text{(Equation 1)}$$

[0082] The host may use an exemplary process **1200**, such as that illustrated by FIG. **12**, to identify the elliptical perimeter **1110**. The exemplary process **1200** connects the origin location and the destination location via a straight line and identifying the length "L" of the straight line (**1210**). The host then multiplies the length "L" by a factor "N" to identify the length of the elliptical perimeter's **1110** major-axis (**1220**).

$$L_{major\text{-}axis}=L*N \quad \text{(Equation 2)}$$

[0083] Where "N" includes a value greater than one to extend the ellipse beyond the origin and destination locations. In one implementation, "N" has a value 1.5. The host then equally extends each side of the straight line to form the major-axis, as shown in FIG. **11**. In another implementation, to form the major-axis, the host extends each side of the straight line by a factor N (or by factors N_1 and N_2 that differ). In this implementation, the length of the elliptical perimeter's **1110** major-axis may be defined by equation 3.

$$L_{major\text{-}axis}=L+2N \quad \text{(Equation 3)}$$

[0084] In either case, the host multiplies the length of the major-axis by a factor "I" to identify the length of the elliptical perimeter's minor-axis (**1230**).

$$L_{Minor\text{-}axis}=L_{Major\text{-}axis}*I \quad \text{(Equation 4)}$$

[0085] Where "I" includes a value less than one to scale the major-axis's length. In one implementation, "I" has a value 0.5. The host then identifies the middle point of the major-axis and draws a straight line perpendicular to the major-axis through the middle point to identify the minor-axis having the length $L_{Minor\text{-}axis}$ (**1240**), as shown in FIG. **11**.

[0086] In one implementation, the host may check to see whether all the identified points of interest include at least one location within the elliptical perimeter **1110**. If not, the host may expand the elliptical perimeter by increasing the length of the major-axis and/or minor-axis. To keep with the above described example, the host may continue this operation until the host identifies, within the elliptical perimeter **1110**, at least one location for the gas station and one location for the grocery store.

[0087] An exemplary process **1300**, such as that illustrated by FIG. **13**, includes selecting a single location for each of the received first and second points of interest. Process **1300** begins with identifying a preliminary route as a starting solution that includes one location for the first point of interest and one location for the second point of interest (**1310**). The host chooses the first location appearing in each set of potential locations to identify the preliminary route. Once the host has identified the starting solution, the host calculates a travel commitment (e.g., a travel time and/or travel distance) associated with the preliminary route, and the host stores the preliminary route as the preferred route (**1320**). Then, the host identifies another route by altering the order in which the previously selected locations for each of the multiple points of interest are visited (**1330**). Additionally or alternatively, the host identifies another route by choosing from each set a different location for the first and/or second points of interest (**1330**). To determine the alternative routes, in one implementation, the host uses a pseudo-random process to change the order in which the locations associated with the first and second points of interest are visited and/or to randomly select a new location from each set of potential locations. The host calculates the travel commitment (e.g., travel time and/or travel distance) for the new route traveling through the rearranged locations and/or the newly identified locations (**1340**). The host compares the travel commitment of the new route to the travel commitment of the preferred route (**1350**). If improvement has occurred (e.g., the travel commitment is further minimized), the host stores the new route as the preferred route (**1370**), and the host moves on to check whether a time limitation has been reached (**1380**). If improvement has not occurred (**1360**, no), the host moves on to check whether a time limitation has been reached (**1380**). If so (**1380**, yes), the host displays the preferred route to the user as the advanced route.

[0088] Depending on the number of potential locations within each set, a process of selecting a single location from each set may be computationally demanding and may require lengthy computation time. As such, the use of the timer in operation block (**1360**) allows the user to identify an optimal route and/or a route close to being optimal within a reasonable time frame. The timer may begin to expire from the time the process starts and the user may set the length of expiration period. In this manner, an optimal route may be identified and presented to the user in a reasonable time.

[0089] If the time limitation has not been reach (**1380**, no), the host moves on to the next operational block to determine whether the travel commitment of the preferred route is less than a threshold (**1390**). The user and/or the host may set a threshold to identify routes with an acceptable travel commitment. In particular, if the preferred route has a travel commitment below the threshold amount (**1390**, yes), then the host stops searching for alternative routes and presents the preferred route to the user (**1395**). If the preferred route has a travel commitment exceeding the set threshold (**1390**, no), the host continues alternating the preferred route by rearranging the order in which the identified locations are visited and/or selecting a new location from the first or second set of potential locations (**1330**). The host continues these operations (e.g., **1330** to **1390**) until a time limitation has been reached or until the host identifies a preferred route with an acceptable travel commitment.

[0090] In another implementation, the process **1300** may be modified to check for a relative improvement between consecutive alternative routes. For example, the host checks to determine whether relative improvement of the travel commitment between the last ten iterations is marginal. If so, the host stops the process **1300** and displays to the user the preferred route. To do so, the host stores in a table the travel commitment associated with each newly identified preferred route, and the host references the table after the host has identified a certain number of preferred routes (e.g., ten). The host then compares the travel commitment associated with the last identified preferred route with the travel commitment associated with the previously identified preferred route. If the improvement in the travel commitment is marginal, the host stops the process **1300** and displays the last identified preferred route to the user. Otherwise, the host continues the process **1300**.

[0091] FIG. **14** illustrates a communication system **1400** is capable of delivering and exchanging data between a client device **1410** and a host **1430** through a delivery network **1420**. The communication system **1400** enables the host **1430** to solicit or otherwise receive from the client device **1410** a search query and to generate a response to the search query.

[0092] Each of the client device **1410** and the host **1430** may be implemented by, for example, a general-purpose computer capable of responding to and executing instructions in a defined manner, a personal computer, a special-purpose computer, a workstation, a server, a device, a component, other equipment or some combination thereof capable of responding to and executing instructions. The client device **1410** may be configured to receive instructions from, for example, a software application, a program, a piece of code, a device, a computer, a computer system, or a combination thereof, which independently or collectively direct operations, as described herein. The instructions may be embodied permanently or temporarily in any type of machine, component, equipment, storage medium, or propagated signal that is capable of being delivered to the client device **1410** or the host **1430**.

[0093] The client device **1410** may include one or more devices capable of accessing content on the host **1430**. The client device **1410** may include a general-purpose computer (e.g., a personal computer ("PC")) capable of responding to and executing instructions in a defined manner, a workstation, a notebook computer, a Personal Digital Assistant ("PDA"), a wireless phone, a component, other equipment, or some combination of these items that is capable of responding to and executing instructions.

[0094] In one implementation, the client device **1410** includes one or more information retrieval software applications (e.g., a browser, a mail application, an instant messaging client, an Internet service provider client, a media player, a mobile location based services client, a mobile mapping and/or navigation client, or AOL video or other integrated client) capable of receiving one or more data units. The information retrieval applications run on a general-purpose operating system and a hardware platform that includes a general-purpose processor and specialized hardware for graphics, communications and/or other capabilities. In another implementation, the client device **1410** includes a wireless telephone running a micro-browser application on a reduced operating system with general purpose and specialized hardware capable of operating in mobile environments.

[0095] In this implementation, the client device **1410** is configured to generate a search query that includes an origin location, a destination location, and an indication of multiple points of interest the user wishes to visit between the origin location and the destination location. The client device **1410** also is configured to display a result responsive to the search query. For example, the client device **1410** may be configured to display an advanced route between the origin location and the destination location that includes and thus encourages travel through a location of each of the user-specified multiple points of interest. The client device **1410** also may display a map and information regarding travel time and/or travel distance for the advanced route.

[0096] The network **1420** includes hardware and/or software capable of enabling direct or indirect communications between the client device **1410** and the host **1430**. As such, the network **1420** includes a direct link between the client device **1110** and the host **1130**, or it includes one or more networks or subnetworks between them (not shown). Each network or subnetwork includes, for example, a wired or wireless data pathway capable of carrying and receiving data. Examples of the delivery network include the Internet, the World Wide Web, a WAN ("Wide Area Network"), a LAN ("Local Area Network"), analog or digital wired and wireless telephone networks, radio, television, cable, satellite, and/or any other delivery mechanism for carrying data.

[0097] The host **1430** includes a general-purpose computer having a central processor unit (CPU), and memory/storage devices that store data and various programs such as an operating system and one or more application programs. Other examples of the host **1430** include a workstation, a server, a special purpose device or component, a broadcast system, other equipment, or some combination thereof capable of responding to and executing instructions in a defined manner.

[0098] The host **1430** includes a host operated by an Online Service Provider that provides mapping services to subscribers. Alternatively or additionally, the host **1430** includes a search provider and/or a mobile device, such as a cellular phone or an in-vehicle navigation system. The host **1430** is configured to receive a search query, including an origin location, a destination location, and an indication of multiple points of interest. In response, the host **1430** identifies a result that is responsive to the search query. To identify the result, the host **1430** may first identify a perimeter around the origin location and the destination location. The perimeter may include an elliptical shape. The host **1430** uses the perimeter to identify, within the perimeter, a set of locations corresponding to each of the multiple points of interest. The host **1430** selects, from the set of locations identified, a location corresponding to each of the multiple points of interest for which the set of locations was identified. The host **1430** identifies an advanced route between the origin location and the destination location that includes and thus encourage travel through a location for each of the multiple points of interest.

[0099] The host **1430** may be configured to provide mapping services to the user of the client device **1410**. In one example, the host **1430** is configured to generate maps and information regarding travel time, and/or travel distance for the advanced route. The host **1430** may be configured to enable selection of different types of directions. For example, the host **1430** may be configured to enable turn-by-turn voice guided navigation, mapping directions, text directions, and/or "other" types of directions, such as walking directions or public transportation directions. The host **1430** may be configured to send this information to the user of the client device **1410** via an instant messenger service, an email, or directly to a client mobile/navigation application.

[0100] In one implementation, the client device **1410** alone may perform the functions described above. For example, the client device **1410** may perform the functions described above by referencing an internal search engine. In another implementation, the host **1430** alone may perform the functions described above. In yet another implementation, the client device **1410** and the host **1430** both may perform some or all of the functions described above.

[0101] Other implementations are also contemplated. For example, the host may identify multiple alternative routes responsive to the search query, and the host may use a different presentation style to present the multiple alternative routes to the user for consideration. For example, the multiple alternative routes may be presented to the user with each of the multiple points of interest color-coded to indicate the category of the point of interest. The alternative routes may be presented in sequence or on a single map so that the user may compare the routes and select the preferred route. In another example, the keywords or terms (e.g., the origin location, the destination location and the first and second points of interest) forming the query may each be received, at the host, from a different source.

[0102] In another example, the host searches, within a perimeter surrounding the origin location and the destination location, to identify multiple points of interest that are co-located. In particular and in keeping with the above-described example, where the user is searching for a gas station and a grocery store, the host uses a perimeter, such as the elliptical perimeter **1110** illustrated by FIG. **11**, to identify a location for a gas station that is located near a location for a grocery store. To this end, the host identifies, within the elliptical perimeter **1110**, all locations associated with the gas station and searches for a location for a grocery store within the vicinity of each of those locations. In this manner, the host identifies a set of co-located gas stations and grocery stores. The host then identities routes traveling through each of the identified co-located gas station and grocery store and determines the travel commitment (e.g., travel time or a travel distance) associated with each route. The host then compares the travel commitment of each route to identify an advance route having the minimum travel commitment and presents that to the user. Additionally, the host may compare the travel commitment associated with the advanced route with the travel commitment associated with an advanced route identified via, for example, processes **100** and **1000** illustrated by FIGS. **1** and **10**, respectively, to determine the one including the least travel commitment and to present that to the user.

[0103] In another implementation, the user may not have a particular destination in mind and may only wish to visit multiple points of interest. Thus, the user may generate a search query via, for example, a UI similar to the UI **200**A in FIG. **2**A that includes an origin location and a label for each of the multiple points of interest. In response, the host may identify at least one location for each of the multiple points of interest, and the host may identify an advanced route from the origin location through the location for each of the multiple points of interest.

[0104] In another implementation, the user may specify the order in which the multiple points of interest should be visited. In this scenario, the host identifies one or more locations for each of the multiple points of interest. The host identifies a preliminary route that travels through a location for each of the multiple points of interest in the user-specified order. The host determines the travel commitment for the preliminary route. The host may alter some or all of the locations for the multiple points of interest to identify a new route. The host determines the travel commitment for the new route and compares it to the travel commitment of the preliminary route. If there is an improvement, the host may use the new route as the advanced route. The host may continue this process until the relative improvement in each iteration is marginal. Alternatively, the host may continue this process until a time threshold for a route has been reached or a time limitation for computing a route has been reached.

[0105] In another implementation, the host may communicate with a calendar application or other applications used to help plan a user's day. For example, the user may have an appointment in the user's calendar to be at a particular location at a predetermined time (e.g., pick up a child at school at 4:00 pm), and the user may request a route that enables the user to stop at an ATM, a grocery store, and a gas station. The user may have previously specified this information in the calendar application and may communicate this information to the host via, for example, "clicking on" an export icon in the calendar application. Upon "clicking on" the export icon, a search query may be generated that includes the current location of the user, the destination location, and the multiple points of interest the user wants to visit along the way. The host identifies and presents to the user one or more routes responsive to the search query.

What is claimed is:

1. A computer-implemented method for identifying a route that is configured to travel through multiple points of interest, the method comprising:

receiving a query that includes an origin location, a destination location, and at least a first point of interest and a second point of interest;

in response to receiving the query, identifying a perimeter that surrounds the received origin and destination locations;

using the identified perimeter as a basis for identifying a first set of potential locations that corresponds to the received first point of interest and that represents less than all potential locations corresponding to the first point of interest;

using the identified perimeter as a basis for identifying a second set of potential locations that corresponds to the received second point of interest and that represents less than all potential locations corresponding to the second point of interest;

selecting, from the first and second set of locations, respectively, a single first potential location corresponding to the received first point of interest and a single second potential location corresponding to the received second point of interest; and

displaying, as an advanced route, a route from the origin location to the destination location that travels through the selected single first potential location corresponding to the received first point of interest and the selected single second potential location corresponding to the received second point of interest.

2. The computer implemented method of claim **1** wherein the first point of interest and the second point of interest each include an indication of an establishment having multiple locations associated therewith.

3. The computer-implemented method of claim **1** wherein identifying the perimeter that surrounds the received origin and destination locations includes identifying an elliptical perimeter.

4. The computer-implemented method of claim **1** further comprising:

determining whether each of the first and second points of interest include at least one location within the perimeter; and expanding parameters of the perimeter if it is determined that at least one of the first or second point of interest does not include the at least one location within the perimeter.

5. The computer-implemented method of claim 4 wherein identifying the perimeter that surrounds the received origin and destination locations includes identifying an elliptical perimeter.

6. The computer-implemented method of claim 1 wherein selecting the single first potential location corresponding to the received first point of interest and the single second potential location corresponding to the received second point of interest further includes:

identifying a preliminary route as an starting solution that includes one first location associated with the first point of interest and one second location associated with the second point of interest, wherein the first and second locations are selected from the first and second sets of potential locations;

identifying a travel commitment for the preliminary route;

storing the preliminary route as a preferred route;

altering the preferred route to identify a new route;

identifying a travel commitment associated with the new route;

comparing the travel commitment associated with the new route with the travel commitment associated with the preferred route; and

if the travel commitment associated with the new route is less than the travel commitment associated with preferred route, storing the new route as the preferred route.

7. The computer-implemented method of claim 6 wherein the travel commitment includes travel time or a travel distance.

8. The computer-implemented method of claim 6 wherein altering the preferred route to identify the new route includes rearranging the order in which the locations associated with the first and second points of interest are visited in the preferred route.

9. The computer-implemented method of claim 6 wherein altering the preferred route to identify the new route includes selecting a new location associated with at least one of the first or second point of interest, and including the newly selected location and at least one location that appears in the preferred route within the new route.

10. The computer-implemented method of claim 9 wherein including the newly selected location within the new route includes displacing one of the locations associated with either the first or second point of interest within the preferred route with the newly selected location.

11. The computer-implemented method of claim 9 wherein the new location supplements the locations associated with the first and second points of interest within the preferred route.

12. The computer-implemented method of claim 9 wherein selecting the new location includes selecting the new location from the first or the second set of potential locations.

13. The computer-implemented method of claim 6 further comprising:

determining whether a time limitation has been reached; and

displaying the preferred route to the user if it is determined that the time limitation has been reached.

14. The computer-implemented method of claim 13 wherein the time limitation begins to expire from a time the process of selecting the single first potential location corresponding to the received first point of interest and the single second potential location corresponding to the received second point of interest begins and the time limitation expires at a pre-defined expiration time; thus, enabling the user to identify the advanced route within a reasonable time frame.

15. The computer-implemented method of claim 14 wherein the pre-defined expiration time is defined by the user or a host.

16. The computer-implemented method of claim 6 further comprising displaying the new route to the user if it is determined that the travel commitment of the new route is less than the threshold.

17. The computer-implemented method of claim 1 wherein selecting the single first potential location corresponding to the received first point of interest and the single second potential location corresponding to the received second point of interest further includes:

identifying co-located locations associated with the first and second points of interest within the first and second sets of potential locations;

identifying a route associated with each of the co-located locations, the route configured to travel through the co-located locations;

identifying a travel commitment associated with each identified route; and

comparing the travel commitment of the identified routes to identify an advanced route with a minimized travel commitment.

18. The computer-implemented method of claim 17 wherein identifying co-located locations includes:

searching, within the second set of potential locations, for a location that appears close to each location appearing in the first set of potential locations;

as a result of the search, identifying one or more co-located locations associated with the first and second points of interest.

19. The computer-implemented method of claim 17 wherein co-located locations include location that appear within a pre-defined time or distance from each other.

20. The computer-implemented method of claim 17 wherein the travel commitment includes travel time or a travel distance.

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