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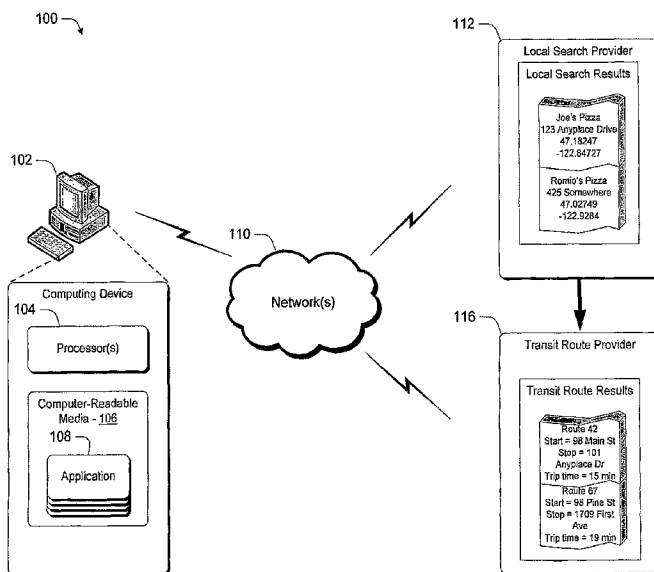
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(54) Title: TRANSIT-COORDINATED LOCAL SEARCH



(57) Abstract: Various embodiments can provide helpful information to a user who is looking for a particular point of interest. In at least some embodiments, first and second searches are conducted. The first search uses a local search provider and produces results which describe one or more points of interest relative to a location, such as a user's current location. Each point of interest can be associated with a destination location to which the user would like to travel. The second search uses a so-called transit route provider and utilizes the results of the first search to plan a transit route between the location and one or more of the respective destination locations.

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Transit-Coordinated Local Search

BACKGROUND

When a person is interested in locating particular points of interest in certain geographic areas, they can often get on line and conduct a search. For example, if a user is interested in pizza restaurants or coffee shops, they might simply access an Internet search provider and input relevant search terms, such as "pizza shop" and the name of the location relative to which they desire to search. Typically, the search will return a list of results and perhaps the addresses associated with the individual search results. This still requires the user to find their way or route to any of the locations to which they wish to travel.

Consider, for example, an individual in a foreign city who does not have their own transportation. Search results, such as the ones described above, still leave the individual with the burden of finding a way or route to get to the location of interest.

SUMMARY

Various embodiments described below can provide helpful information to a user who is looking for a particular point of interest. In at least some embodiments, first and second searches are conducted. The first search uses a local search provider and produces results which describe one or more points of interest relative to a location, such as the user's current location. Each point of interest can be associated with a destination location to which the user would like to travel. The second search uses a so-called transit route provider and utilizes the results of the first search to plan a transit route between the location and one or more of the respective destination locations.

1 In at least some embodiments, the transit route provides the user with
2 information that can be useful in helping the user select a particular mode of transit
3 (and route) to reach their intended destination. For example, the transit route might
4 include a listing of bus stops, routes and travel times. Thus, a user can be presented
5 with different travel options for reaching their intended destination.

6 7 **BRIEF DESCRIPTION OF THE DRAWINGS**

8 Fig. 1 illustrates a system in which the inventive principles can be employed
9 in accordance with one embodiment.

10 Fig. 2 illustrates an example of search results using a local search provider, in
11 accordance with one embodiment.

12 Fig. 3 illustrates a conceptual example of search results using a transit route
13 provider that utilizes local search results, in accordance with one embodiment.

14 Fig. 4 is a flow diagram that describes steps in a method in accordance with
15 one embodiment.

16 17 **DETAILED DESCRIPTION**

18 **Overview**

19 Various embodiments described below can provide helpful information to a
20 user who is looking for a particular point of interest. In at least some embodiments,
21 first and second searches are conducted. The first search uses a local search
22 provider and produces results which describe one or more points of interest relative
23 to a location, such as the user's current location. Each point of interest can be
24 associated with a destination location to which the user would like to travel. The
25 second search uses a so-called transit route provider and utilizes the results of the
first search to plan a transit route between the location and one or more of the
respective destination locations.

1 In at least some embodiments, the transit route provides the user with
2 information that can be useful in helping the user select a particular mode of transit
3 (and route) to reach their intended destination. For example, the transit route might
4 include a listing of bus stops, routes and travel times. Thus, a user can be presented
5 with different travel options for reaching their intended destination.

6 7 **Exemplary Implementation**

8 Fig. 1 illustrates an exemplary system, generally at 100, in which various
9 embodiments described below can be implemented in accordance with one
10 embodiment. These various embodiments can coordinate local search results with
11 transit data to produce relevant search results that can enable a user to make
12 informed decisions on the particular type of transit and route to take to an intended
13 destination.

14 System 100 includes, in this example, one or more computing devices 102
15 each of which includes one or more processors 104, one or more computer-readable
16 media 106 and one or more applications 108 that reside on the computer-readable
17 media and which are executable by the processor(s).

18 Although computing device 102 is illustrated in the form of a desktop
19 computer, it is to be appreciated and understood that other computing devices can be
20 utilized without departing from the spirit and scope of the claimed subject matter.
21 For example, other computing devices can include, by way of example and not
22 limitation, portable computers, handheld computers such as personal digital
23 assistants (PDAs), cell phones and the like. In some implementations, particularly
24 those that utilize handheld computing devices, mobile users are provided with a way
25 to conveniently search and acquire transit route information that can be immediately
acted upon. For example, a user in an unfamiliar city who is interested in eating
lunch at a pizza parlor can quickly do a search to locate geographically close pizza

1 parlors, and then have transit routes to the pizza parlors selected for their current
2 location. Once imparted with this information, the user can quickly locate a
3 particular conveyance, such as a bus or subway, and be off to their destination.

4 System 100 also includes at least one network 110 that can be used by
5 computing device 102 to communicate with a local search provider 112 and/or a
6 transit route provider 116. All or part of network(s) 110 can include or make use of
7 the Internet. Although the local search provider and transit route provider are
8 illustrated as remote from computing device 102, it is to be appreciated and
9 understood that one or more of these providers can reside on the computing device
10 itself. In network embodiments, any suitable protocols can be utilized to enable
11 communication between computing device 102, local search provider 112, and
12 transit route provider 116.

13 In practice, the local search provider 112 is configured to receive input from
14 the user and, responsively, conduct a search to locate places of interest that meet
15 search criteria entered by the user. Examples of local search providers include
16 Internet search providers that search the Internet using well known techniques. For
17 example, a user might be interested in pizza places in their geographic proximity or
18 within the proximity of a location that is provided by the user. By virtue of knowing
19 their location or providing a location, the user can enter search parameters that are
20 then used to find places of interest that are geographically close to the provided
21 location. A location, such as the user's location, can either be entered by the user
22 (as by entering a street or address) or through some other means, such as through
23 GPS input to the computing device, cell node, wireless network node, and the like.
24 There are a number of ways to determine a current location, any of which can be
25 used.

Thus, when a user enters their search criteria, the local search provider can
use the search criteria to conduct a search and return a set of results. The set of

1 results pertains to one or more points of interest relative to the location provided by
2 the user. The points of interest can be associated with one or more respective
3 destination locations to which a user wishes to travel either from a current location
4 or a provided location. The search results can include each destination location's
5 geographical proximity to the location provided by the user.

6 In the example of Fig. 1, the user is interested in pizza shops that are near
7 their current location. Notice here that the user's search criteria has been used by
8 the local search provider to identify two different pizza shops—Joe's Pizza and
9 Romio's Pizza, along with their addresses and other information.

10 In practice, transit route provider 116 is configured to utilize aspects of the
11 local search's results to develop transit route results which define a transit route(s)
12 between the location provided by the user (either their current location or some
13 other location) and one or more of the destination locations identified by the local
14 search. Typically, a transit route provider has access to information that can be
15 utilized to plan routes. For example, many cities have on line, web-accessible sites
16 that can be used to plan a trip from point A to point B. In this case, the transit route
17 provider utilizes the location provided by the user and the destination location(s) to
18 access a database and plan an appropriate transit route.

19 In the context of this document, a transit provider can include, by way of
20 example and not limitation, a provider of public transit (buses, subways, etc.) or any
21 other scheduled transportation system or mode of conveyance. One characteristic of
22 such modes of conveyance is that they are not typically under the control of the user
23 and they are available for the public at large to use.

24 Transit route providers can often provide or use real time information that
25 pertains to individual routes to plan potential transit routes between a current
location and one or more destination locations. For example, if an accident occurs

1 along a particular route thus slowing traffic, the transit route provider can take this
2 into account when planning routes.

3 In the Fig. 1 example, the results of the local search describing points of
4 interest or respective destinations (i.e., Joe's Pizza, Romio's Pizza, etc.) have been
5 utilized to search for and identify transit routes between the current location and
6 each respective destination. Specifically, notice that two individual routes have
7 been identified for one or more of the search results – Route 42 and Route 67. Each
8 identified route includes a starting and stopping location, along with an estimated
9 trip time. This information can be utilized by the user to select an appropriate route.
10 For example, if the user is closer to Main Street and in a hurry, they might select
11 Route 42. If, on the other hand, the user is not in a particular hurry, they might
12 select the longer of the routes—Route 67.

13 14 **Local Search Results and Transit Route Results**

15 Figs. 2 and 3 diagrammatically or pictorially represent the type of
16 information available, in accordance with one embodiment, from local search results
17 and transit route results as discussed above regarding Fig. 1. More specifically, Fig.
18 2 represents an example of search results using a local search provider, and Fig 3.
19 represents an example of search results using a transit route provider that has
20 utilized local search results provided by the local search provider.

21 Fig. 2 shows, generally at 200, a pictorial example that represents the local
22 search results obtained from a local search provider in the Fig. 1 example. In this
23 example, these results were obtained by inputting two categorical search terms, i.e.
24 “pizza restaurants” and the city name. Note that various local pizza restaurants,
25 which are points of interest, are shown relative to a current location. Both “Joe’s
Pizza” (1) and “Romio’s Pizza” (2) are labeled for illustrative purposes. Note also

1 that address information for each location is shown or otherwise provided for the
2 user.

3 However, this information alone may not allow the user to determine which
4 restaurant and/or respective route thereto is most convenient and accessible.
5 Consider again the user who relies on a public transportation or transit system such
6 as a bus, subway, or shuttle service to get to one of the restaurants. Since the system
7 is not under the user's control (e.g. since they cannot physically get into and drive
8 their own car to the destination locations), additional information such as the
9 system's access location(s), departure time(s), physical route(s), number of transfers,
10 etc. is important to the user in determining which restaurant to choose and which
11 route to take. Often, this transit route information is made available by the transit
12 system provider as indicated above.

13 Consider now Fig. 3 which shows, generally at 300, a pictorial representation
14 of transit route information that has obtained from searching a transit route provider
15 using the local search results described above. Here, the transit routes are illustrated
16 as dark lines.

17 Table 302 illustrates the specific local pizza restaurants (local search results)
18 coordinated with one or more of their respective itineraries/routes (transit route
19 results). Here, "Joe's Pizza" and "Romio's Pizza" are each shown with two of
20 potentially many respective routes available to a user at the current location. In this
21 example, Search "1" corresponds to Joe's Pizza and Search "2" corresponds to
22 Romio's Pizza.

23 As noted above, information provided by the transit route provider regarding
24 each of these respective routes is useful in determining which restaurant and
25 respective route is most convenient and accessible. In addition, transit routes can be
sorted based on real time route information available from the provider. Thus, the

1 user might see their search results sorted in accordance with actual travel time with
2 due consideration for the actual traffic conditions at the time.

3 4 Exemplary Method

5 Fig. 4 is a flow diagram that illustrates steps in a method in accordance with
6 one embodiment. The method can be implemented in connection with any suitable
7 hardware, software, firmware or combination thereof. In one embodiment, the
8 method is implemented in software in the form of computer-executable instructions,
9 such as those defining an application that executes on a client computing device and
10 those executing on behalf of a local search provider and a transit route provider.

11 Step 400 causes a first search to be conducted using a local search provider.
12 As noted above, the local search provider may be remote from a computing device
13 and the computing device can use one or more networks to communicate with the
14 local search provider. Alternately or additionally, the local search provider can be
15 embodied locally on the computing device. Examples of a first search are given
16 above.

17 Step 402 causes a second search to be conducted using a transit route
18 provider. This second search can utilize the results of the first local search,
19 described above, to plan a transit route between the current location and one or more
20 of the individual points of interest (potential destination locations). As noted above,
21 the transit route provider may be remote from a computing device and the
22 computing device can use one or more networks, such as the Internet, to
23 communicate with the transit route provider. Alternately or additionally, the transit
24 route provider can be embodied locally on the computing device. Examples of a
25 second search are given above.

Optionally, step 404 can sort the transit routes in accordance with pre-
determined criteria. This sorting can be based on real time information that is

1 available to transit route provider, examples of which are provided above. Pre-
2 determined criterion can further include, by way of example and not limitation:
3 distance to travel, time to travel, number of transfers necessary, and the like. In the
4 context of the above example involving pizza restaurants in a certain city, the
5 available transit routes between the current location and each specific pizza
6 restaurant (like "Joe's Pizza" and "Romio's Pizza") can be sorted by criteria that is
7 meaningful to the user in choosing the most convenient or accessible route.

8 It is to be appreciated and understood that while the local search provider and
9 the transit search provider are depicted as logically different entities, such need not
10 be the case. For example, the functionality provided by both the local search
11 provider and the transit route provider can be provided by a single entity, such as a
12 service, without departing from the spirit and scope of the claimed subject matter.

13 14 Conclusion

15 The various embodiments described above provide helpful information to a
16 user looking for a particular point of interest. By having information such as
17 destination locations and available routes to reach the destination locations, users
18 can make timely and informed decisions as to the best mode of travel.

19 Although the invention has been described in language specific to structural
20 features and/or methodological steps, it is to be understood that the invention
21 defined in the appended claims is not necessarily limited to the specific features or
22 steps described. Rather, the specific features and steps are disclosed as preferred
23 forms of implementing the claimed invention.

1 CLAIMS:

2
3 1. A method comprising:

4 causing (400) a first search to be conducted, using a local search provider, the
5 results of which describe one or more points of interest relative to a current location,
6 individual points of interest being associated with respective destination locations;
7 and

8 causing (402) a second search to be conducted, utilizing a transit route
9 provider, that utilizes the results of the first search to plan a transit route between the
10 current location and one or more of the respective destination locations.

11
12 2. The method of claim 1, wherein at least one of said local search
13 provider or said transit route provider is remote from a computing device that causes
14 said searches to be conducted.

15
16 3. The method of claim 1, wherein at least one of said acts is performed,
17 at least in part, over the Internet.

18
19 4. The method of claim 3, wherein said causing of the second search is
20 performed by providing, via the Internet, the results of the first search to said transit
21 route provider.

22
23 5. The method of claim 1, further comprising sorting transit routes in
24 accordance with at least one pre-determined criterion.

25

1 6. The method of claim 5, wherein the sorting is based, at least in part, on
2 real time information that is received and which pertains to the transit routes.

3
4 7. The method of claim 6, wherein one criterion pertains to the time to
5 travel from the current location to a destination location using a transit route.

6
7 8. The method of claim 6, wherein one criterion pertains to the distance
8 from the current location to a destination location .

9
10 9. One or more computer-readable media having computer-readable
11 instructions thereon which, when executed by a computer, implement the method of
12 claim 1.

13
14 10. A computing device embodying the computer-readable media of
15 claim 9.

16
17 11. A method comprising:
18 causing (400), via the Internet, a first search to be conducted the results of
19 which describe one or more points of interest relative to a current location,
20 individual points of interest being associated with respective destination locations;
21 causing (402), via the Internet, a second search to be conducted that utilizes
22 the results of the first search to plan a transit route between the current location and
23 one or more of the respective destination locations, wherein the transit route utilizes
24 a mode of conveyance that is not under the control of a user disposed at the current
25 location; and

 sorting (404) transit routes in accordance with pre-determined criteria.

1 12. The method of claim 11, wherein the sorting is based, at least in part,
2 on real time information that is received and pertains to the routes.

3
4 13. The method of claim 12, wherein said sorting uses at least one
5 criterion that pertains to the time to travel from the current location to a destination
6 location using a transit route.

7
8 14. The method of claim 12, wherein said sorting uses at least one
9 criterion that pertains to the distance from the current location to a destination
10 location.

11
12 15. One or more computer-readable media having computer-readable
13 instructions thereon which, when executed by a computer, implement the method of
14 claim 11.

15
16 16. A computing device embodying the computer-readable media of
17 claim 15.

18
19 17. A system comprising:
20 one or more computer-readable media (106) having computer-readable
21 instructions thereon (108) which, when executed by a computing device (102),
22 cause the computing device to:

23 conduct (400) a first search, via the Internet, using a first search
24 provider that is remote from the computing device;

25 conduct (402) a second search, via the Internet, using a second
different search provider that is remote from the computing device, wherein
the second search utilizes results from the first search to plan a transit route

1 between a current location and one or more respective destination locations,
2 wherein the transit route utilizes a public transit mode of conveyance that is
3 not under the control of a user disposed at the current location; and

4 sort (404) one or more transit routes in accordance with pre-
5 determined criteria.

6
7 18. The system of claim 17, wherein said sorting is based, at least in part,
8 on real time information that is received and which pertains to the transit routes.

9
10 19. The system of claim 18, wherein one criterion pertains to the time to
11 travel from the current location to a destination location using a transit route.

12
13 20. The system of claim 18, wherein one criterion pertains to the distance
14 from the current location to a destination location.

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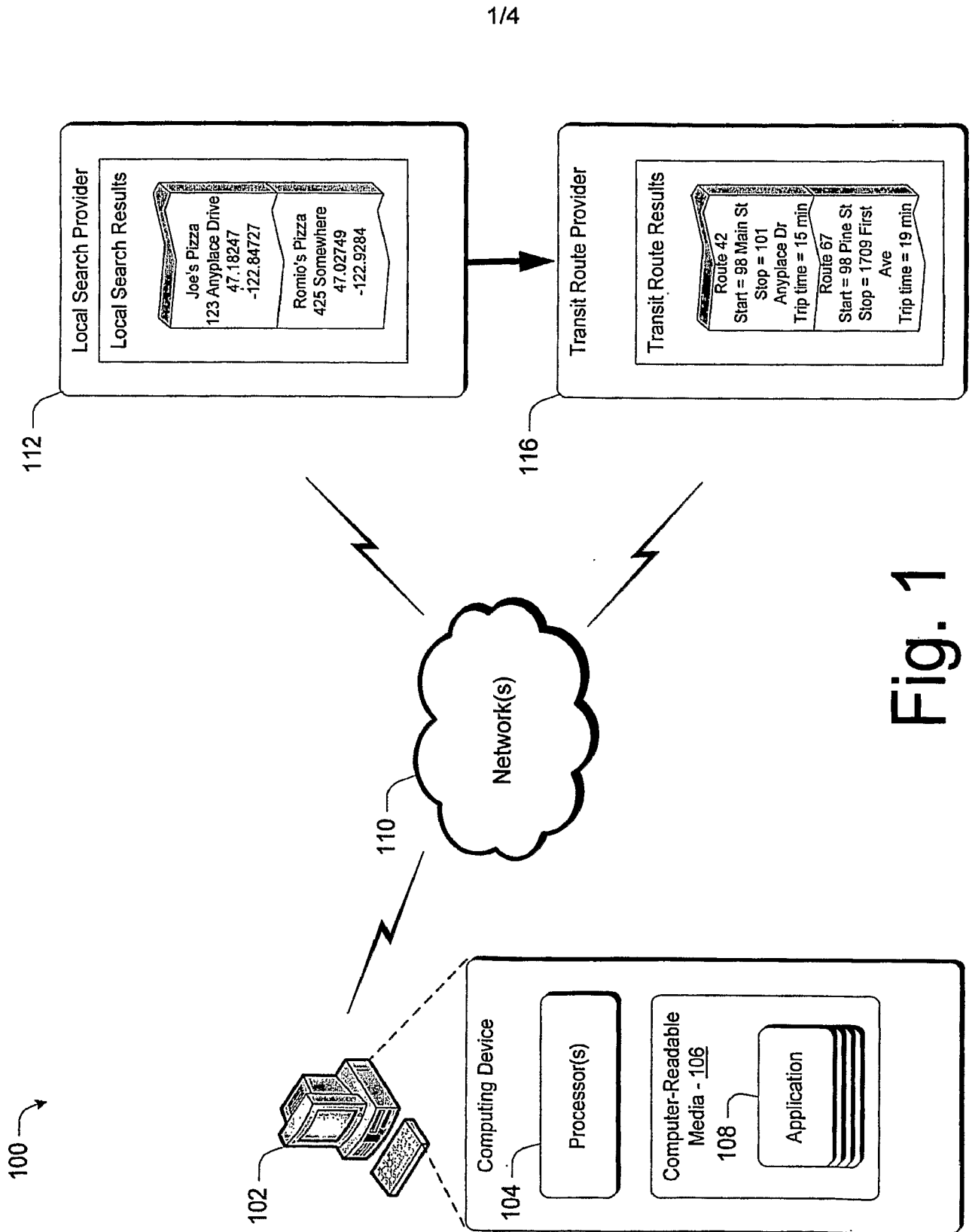


Fig. 1

200 →

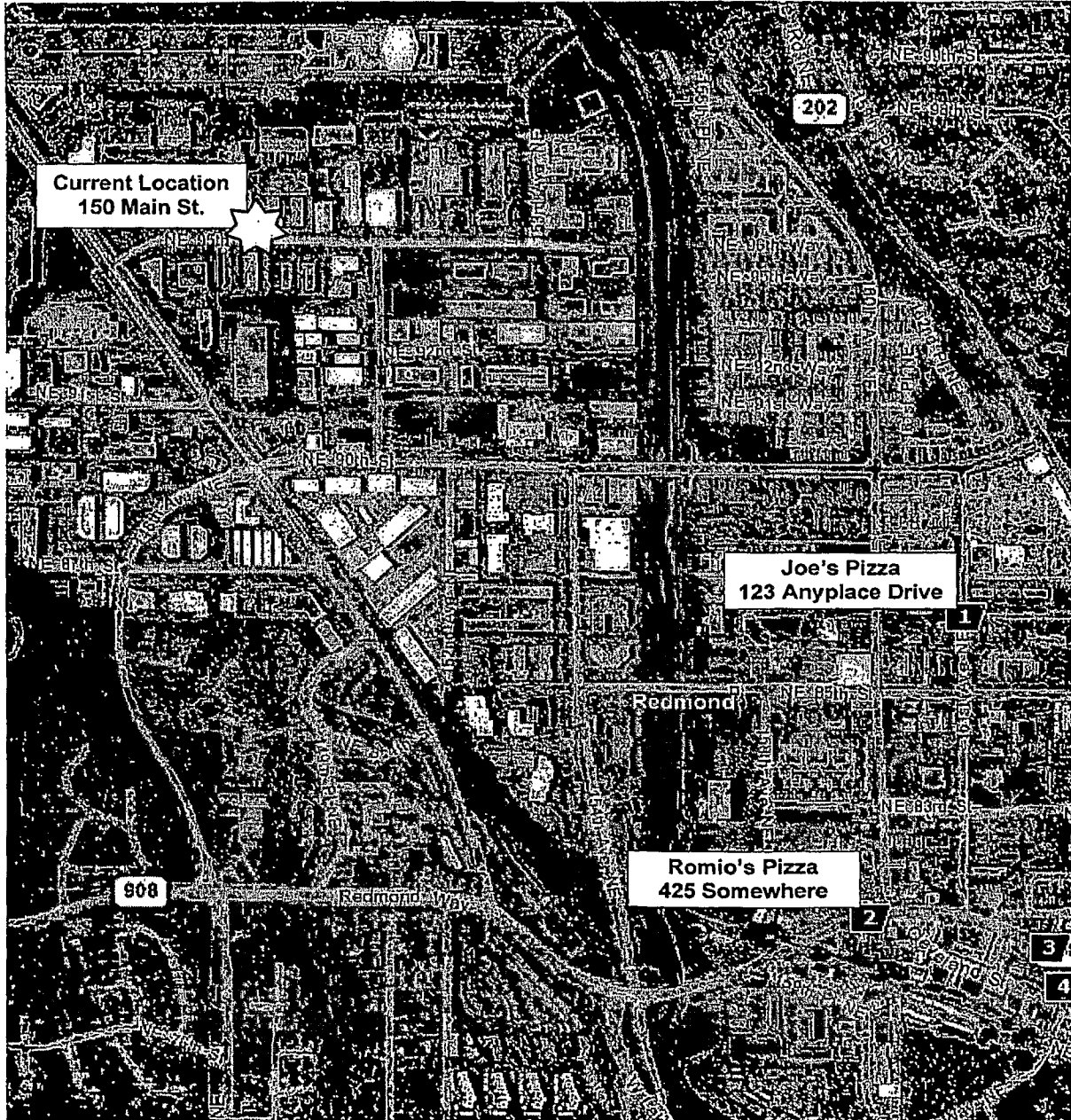


Fig. 2

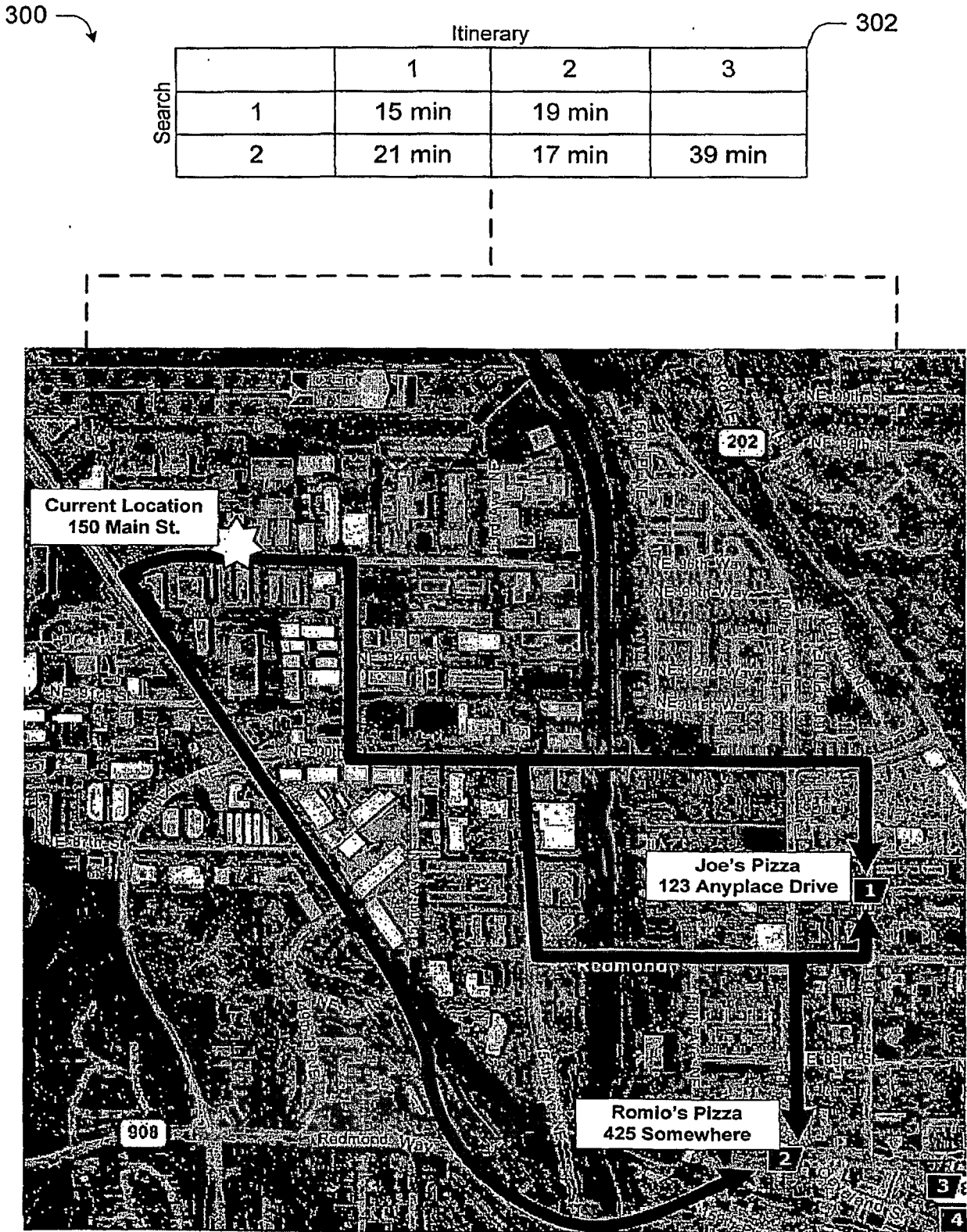


Fig. 3

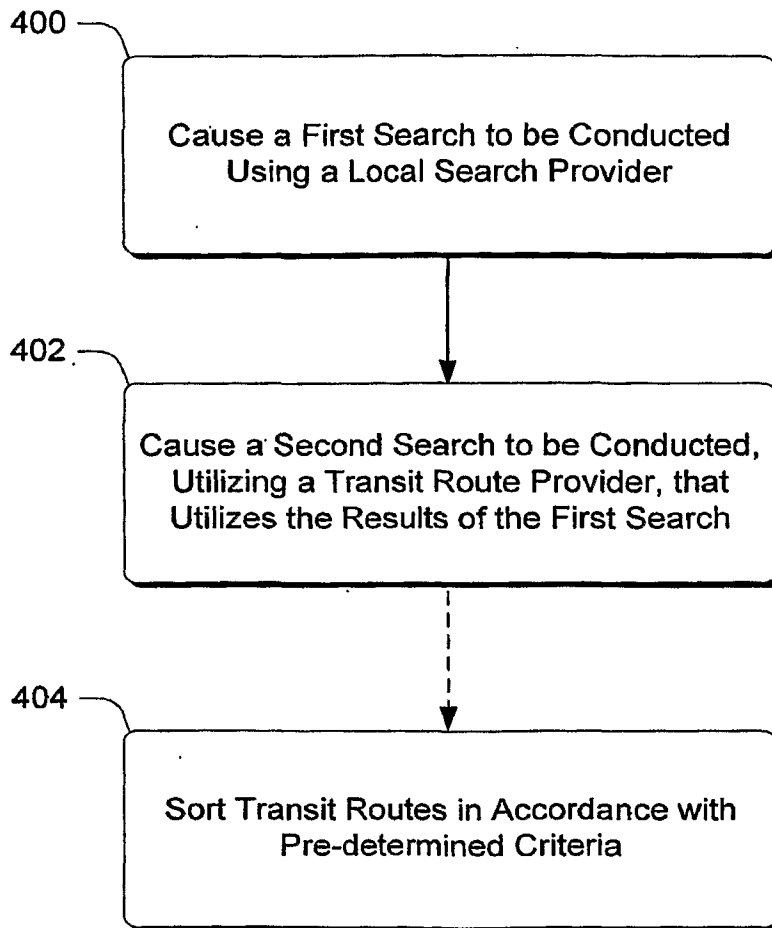


Fig. 4

A. CLASSIFICATION OF SUBJECT MATTER**G06F 17/30(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8: G06F H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO internal), IEEEExplore, "Keyword: local, search, route, interest, and similar terms"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2001-0109855 A (THINKWARESYSTEMS CORP.) 12 December 2001 see abstract; figures 1-4; pages 3-5; claims 1-7, 10-14;	1-20
A	KR 10-2006-0006271 A (SK TELECOM CO., LTD.) 19 January 2006 see figures 2, 4; pages 4-5; claims 1-2, 5-8;	1-20
A	KR 10-2005-0057933 A (LG ELECTRONICS INC.) 16 June 2005 see figure 6; pages 3-4; claims 1, 3;	1-20
A	KR 10-2005-0122796 A (SK TELECOM CO., LTD.) 29 December 2005 see figure 2; pages 4-5; claims 1, 5-6, 9;	1-20
A	US 06421606 B1 (GORO ASAI ET AL) 16 July 2002 see figures 1-2; column 1, line 20-column 2, line 35; claims 1, 3-4;	1-20
A	US 05978733 A (MASATSUGU DESHIMARU ETAL) 02 November 1999 see figures 1, 12, 13, 17, 19-22; column 2, line 14-column 3, line 26; claims 1, 5;	1-20
A	US 06175800 B1 (TAKASHI MORI ET AL) 16 January 2001 see figures 4-5; column 1, line 15-column 2, line 23; claims 1-5;	1-20

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

02 AUGUST 2007 (02.08.2007)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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Facsimile No. 82-42-472-7140

Authorized officer

SONG, Byoung Jun

Telephone No. 82-42-481-5677



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2007/004800

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR2001109855A	12.12.2001	NONE	
KR2006006271A	19.01.2006	NONE	
KR2005057933A	16.06.2005	NONE	
KR2005122796A	29.12.2005	NONE	
US06421606 B1	16.07.2002	DE60010993C0 EP01077362B1 EP1077362A1 JP13106076 JP13108457 JP13124569 JP13141471 JP13165683 JP3367514B2 US6421606BA	01.07.2004 26.05.2004 21.02.2001 17.04.2001 20.04.2001 11.05.2001 25.05.2001 22.06.2001 14.01.2003 16.07.2002
US05978733 A	02.11.1999	DE69719694C0 EP00847034B1 EP01191499B1 EP01199694B1 JP10170294A2 JP10170295 JP10170296 KR1019980064046 US5978733A	17.04.2003 12.03.2003 08.03.2006 08.03.2006 26.06.1998 26.06.1998 26.06.1998 07.10.1998 02.11.1999
US06175800 B1	16.01.2001	DE69926435C0 EP00955520B1 EP0955520A1 JP11304517A2 JP3581559B2 KR1019990083357 US6175800BA	08.09.2005 03.08.2005 10.11.1999 05.11.1999 27.10.2004 25.11.1999 16.01.2001