



(11) **EP 2 884 444 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.06.2015 Bulletin 2015/25

(51) Int Cl.:
G06Q 30/00 (2012.01)

(21) Application number: **13196433.0**

(22) Date of filing: **10.12.2013**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME

(71) Applicant: **Google Inc.**
Mountain View, CA 94043 (US)

(72) Inventors:
• **Venkataraman, Shivakumar**
Santa Clara, CA 95054 (US)
• **Jain, Tarun Kumar**
Sunnyvale, CA 94086 (US)
• **Petrovic, Srdjan**
Palo Alto, CA 94306 (US)

- **Mar Hrafnkelsson, Arnar**
Los Altos, CA 94024 (US)
- **Robinson, William Sands**
Chicago, IL 60611 (US)
- **blout, Alan**
Cambridge, MA 02139 (US)
- **Jones, David Lloyd**
Sunnyvale, CA 94086 (US)

(74) Representative: **Derry, Paul Stefan**
Venner Shipley LLP
200 Aldersgate
London EC1A 4HD (GB)

Remarks:

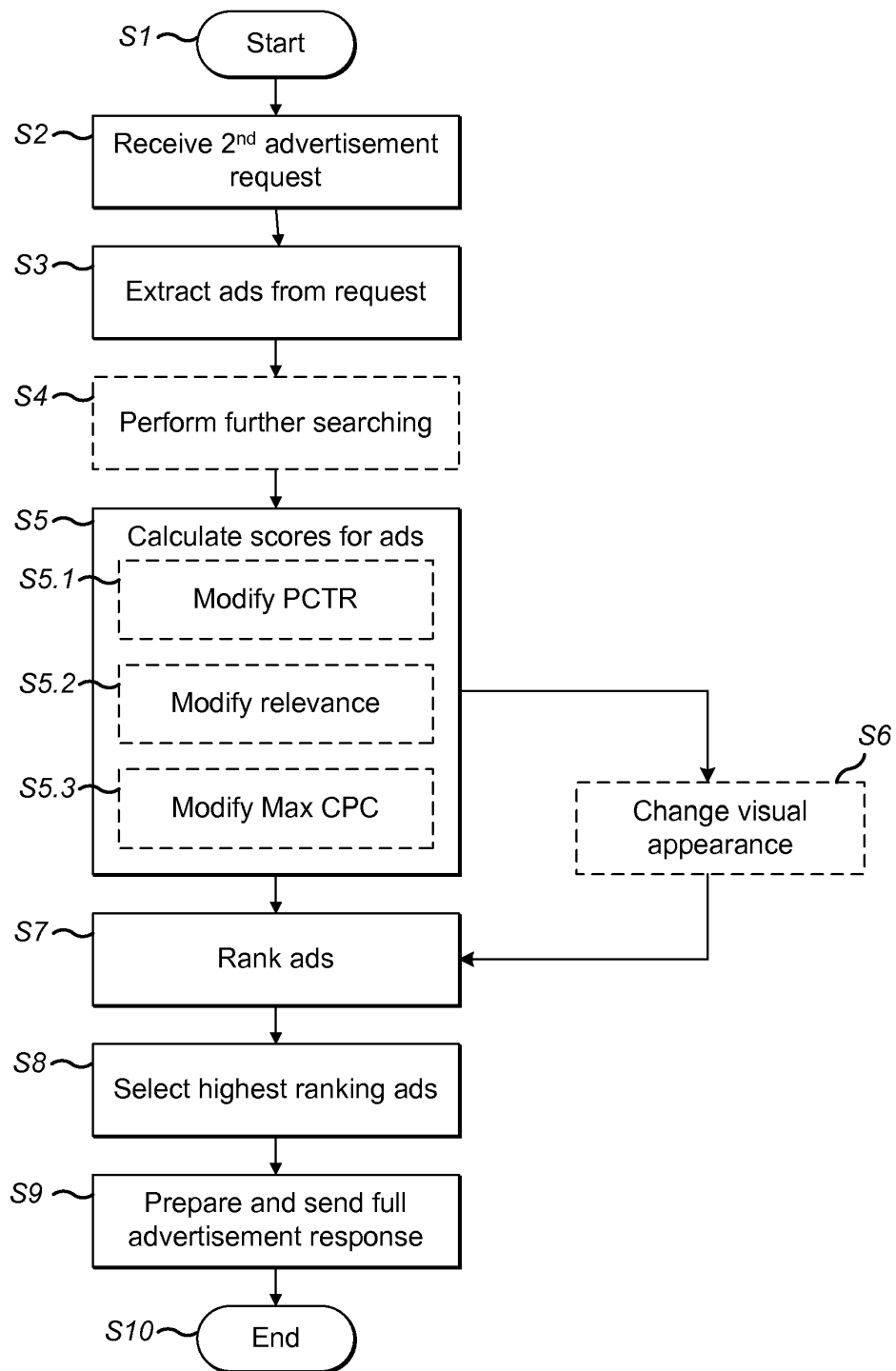
Amended claims in accordance with Rule 137(2)
EPC.

(54) **Handling search queries**

(57) A system for providing advertisements with search results in response to a search query comprises a front end and at least first and second advertisement servers. The front end is configured: to receive a search query; and to send a search request to a search server and to send a first advertisement request to an advertisement server, wherein the search request includes the search query or information based on the search query, and wherein the first advertisement request includes the search query or information based on the search query and an indication that an interim advertisement response is to be provided. The first advertisement server is configured: in response to receiving the first advertisement request, to search for advertisements related to the search query to produce plural advertisement results; to select a plurality of the plural advertisements; to prepare an interim advertisement response including some or all content of the selected plural advertisements; and to send the interim advertisement response to the front end. The front end is configured: to receive search results from the search server; to receive the interim advertisement response from the first advertisement server; and to send at least some of the search results and at least some of

the interim advertisement response to the advertisement server in a second advertisement request, wherein the second advertisement request includes an indication that a full advertisement response is to be provided. The second advertisement server is configured: to receive the second advertisement request; to calculate a score for plural ones of the advertisements included in the interim advertisement response to produce plural advertisement results each with an associated score, the score for some of the plural ones of the advertisements being based on the search results included in the second advertisement request; to rank the plural advertisement results according to their scores; to select one or more of the highest ranked plural advertisement results; and to send a full advertisement response to the front end, the full advertisement response including the selected one or more highest ranked plural advertisement results. The front end is configured: to provide the search results with the selected one or more highest ranked plural advertisement results.

EP 2 884 444 A1

**FIG. 5**

Description

Field of the Invention

[0001] This invention relates to handling search queries. In particular, it relates to providing advertisements with search results in response to a search query.

Background to the Invention

[0002] Worldwideweb search services, such as those provided by Google, Inc. through google.com, have been used for a number of years and have been becoming increasingly sophisticated.

[0003] It is common when providing search results to a user to provide also one or more advertisements. Advertisements are paid for by advertisers, who are normally charged by the provider of the search services on the basis of a number of impressions (the number of times that an advertisement is presented to users) or on the basis of click-through (the number of occasions on which users click on a link in an advertisement, thereby directing traffic to the advertiser's website). A webpage provided in response to a search query thus typically has two components. The first is a number of search results, which are discreet listings that have been selected by a search engine used by the search services provider to identify webpages that are anticipated to be of interest to the user that submitted the search query. The second component of the webpage is one or more advertisements, which are selected by an advertisement server operated by the search services provider and which have been selected as likely being of interest to the user, based on the search query.

[0004] It would be desirable to take into account the search results provided by the search server when selecting advertisements for inclusion in the webpage. However, it has not heretofore been technically feasible to use the results provided by the search server in selecting advertisements without increasing the time between receiving a search query and providing the webpage of search results to an unacceptably long time. The present invention seeks to provide a solution to this problem.

Summary of the Invention

[0005] A first aspect of the invention provides: a system for providing advertisements with search results in response to a search query, the system comprising a front end and at least first and second advertisement servers, wherein:

the front end is configured:

to receive a search query; and
to send a search request to a search server and
to send a first advertisement request to an ad-

vertisement server, wherein the search request includes the search query or information based on the search query, and wherein the first advertisement request includes the search query or information based on the search query and an indication that an interim advertisement response is to be provided;

the first advertisement server is configured:

in response to receiving the first advertisement request, to search for advertisements related to the search query to produce plural advertisement results;
to select a plurality of the plural advertisements;
to prepare an interim advertisement response including some or all content of the selected plural advertisements; and
to send the interim advertisement response to the front end;

the front end is configured:

to receive search results from the search server;
to receive the interim advertisement response from the first advertisement server; and
to send at least some of the search results and at least some of the interim advertisement response to the advertisement server in a second advertisement request, wherein the second advertisement request includes an indication that a full advertisement response is to be provided;

the second advertisement server is configured:

to receive the second advertisement request;
to calculate a score for plural ones of the advertisements included in the interim advertisement response to produce plural advertisement results each with an associated score, the score for some of the plural ones of the advertisements being based on the search results included in the second advertisement request;
to rank the plural advertisement results according to their scores;
to select one or more of the highest ranked plural advertisement results; and
to send a full advertisement response to the front end, the full advertisement response including the selected one or more highest ranked plural advertisement results; and

the front end is configured:

to provide the search results with the selected one or more highest ranked plural advertisement results.

[0006] The second advertisement server may be configured to respond to receiving the second advertisement request by performing an additional search for advertisements using information forming part of the second advertisement request.

[0007] The second advertisement request may include a predicted click-through rate parameter value for each of the plural ones of the advertisements and the second advertisement server may be configured to modify the predicted click-through rate parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements. Here, the second advertisement server may be configured to modify the score of at least one of the plural advertisement results by modifying the predicted click-through rate of at least one of the plural advertisement results depending on user interface elements that are indicated in the search results included in the second advertisement request.

[0008] The second advertisement request may include a bid parameter value for each of the plural ones of the advertisements and the second advertisement server may be configured to modify the bid parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements.

[0009] The second advertisement request may include a relevance score parameter value for each of the plural ones of the advertisements and the second advertisement server may be configured to modify the relevance score parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements. Here, the second advertisement server may be configured to modify the relevance score parameter value of at least one of the plural advertisement results based on content of the top one of multiple search results included in the second advertisement request. Alternatively or additionally, the second advertisement server may be configured to modify the relevance score parameter value of at least one of the plural advertisement results based on a location of the top one of multiple search results included in the second advertisement request.

[0010] The number of advertisements included in the interim advertisement response may be at least equal to 250, at least equal to 500, or at least equal to 740 or at least equal to 1000.

[0011] The number of advertisements included in the interim advertisement response may be at least 100

times greater than the number of advertisements included in the full advertisement response.

[0012] The front end may be configured to process the search results received from the search server and, for the at least some of the search results, to include some but not all of the information comprising the search results in the second advertisement request.

[0013] The front end may be configured to include in the second advertisement request one or more of:

content type information;
map information indicating a map area;
information identifying the presence or absence of a knowledge card; and information specific to the user.

[0014] The second advertising server may be configured to modify visual appearance characteristics of one or more advertisements based on the search results included in the second advertisement request.

[0015] A second aspect of the invention provides a method of providing advertisements with search results in response to a search query, the method comprising:

a front end:

receiving a search query; and
sending a search request to a search server and
sending a first advertisement request to an advertisement server, wherein the search request includes the search query or information based on the search query, and wherein the first advertisement request includes the search query or information based on the search query and an indication that an interim advertisement response is to be provided;

a first advertisement server:

in response to receiving the first advertisement request, searching for advertisements related to the search query to produce plural advertisement results;
selecting a plurality of the plural advertisements;
preparing an interim advertisement response including some or all content of the selected plural advertisements; and
sending the interim advertisement response to the front end;

the front end:

receiving search results from the search server;
receiving the interim advertisement response from the first advertisement server; and
sending at least some of the search results and at least some of the interim advertisement response to the advertisement server in a second advertisement request, wherein the second ad-

vertisement request includes an indication that a full advertisement response is to be provided;

a second advertisement server:

receiving the second advertisement request;
calculating a score for plural ones of the advertisements included in the interim advertisement response to produce plural advertisement results each with an associated score, the score for some of the plural ones of the advertisements being based on the search results included in the second advertisement request;
ranking the plural advertisement results according to their scores;
selecting one or more of the highest ranked plural advertisement results; and
sending a full advertisement response to the front end, the full advertisement response including the selected one or more highest ranked plural advertisement results; and

the front end:

providing the search results with the selected one or more highest ranked plural advertisement results.

[0016] The invention also provides a computer program comprising machine readable instructions that when executed control a system comprising a front end and first and second advertisement servers to perform this method.

Brief Description of the Drawings

[0017] Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram illustrating a system operating according to aspects of the invention;
Figure 2 is a flow chart illustrating high level operation of the system of Figure 1 according to aspects of the invention;
Figure 3 is a flow chart illustrating operation of a front end of the system of Figure 1 according to aspects of the invention;
Figure 4 is a flow chart illustrating operation of a first advertisement server of the system of Figure 1 according to aspects of the invention;
Figure 5 is a flow chart illustrating operation of a second advertisement server of the system of Figure 1 according to aspects of the invention; and
Figure 6 is a schematic diagram illustrating components within some components of the Figure 1 system.

Detailed Description of Embodiments

[0018] Referring firstly to Figure 1, a system 100 operating according to aspects of the invention will now be described.

[0019] The system 100 includes three main components. These are a front end 101, a search server system 102 and an advertisement (ads) server system 103. The server system 102 is in bidirectional communication with the front end 101. The ads server system 103 is in bidirectional communication with the front end 101. In this example, there is no direct communication between the search server system 102 and the ads server system 103.

[0020] The search server system 102 comprises multiple servers. These are illustrated schematically in Figure 1 as first to fourth servers 102a ... 102d. However, it will be appreciated that this is merely schematic and that the search server system may comprise between one and many hundreds of physical servers.

[0021] Similarly, the ads server system 103 is shown in Figure 1 as comprising multiple (in this case, four) ads servers 103a ... 103d. However, the ads server system 103 may comprise any number of physical servers between two and many hundreds of physical servers. The ads servers 103a ... 103d may be co-located, or they may be located within different buildings or different sites. Different ones of the servers may even be in different regions or countries.

[0022] Although not shown, the front end 101 may be replicated such that there are multiple front ends. Only one front end 101 is shown to simplify the following explanation.

[0023] A load balancer 104 is connected between the front end 101 and the ads server system 103. Operation of the load balancer 104 is described in some detail below.

[0024] The ads server system 103 is bidirectionally connected to three subsystems. A first system is a retrieve subsystem 105. A second subsystem is a PCTR, or predicted click-through rate, subsystem 106. A third subsystem is a relevance score subsystem 107. Each of the servers 103a - 103d of the ads server system 103 may include dedicated retrieve, PCTR and relevance score subsystems 105, 106, 107. Alternatively, multiple ones of the ads servers 103a to 103d may share common retrieve, PCTR and relevance score subsystems 105-107.

[0025] The front end 101 is a system comprising a server or multiple servers. The front end 101 is the system that is accessed when a user accesses a home webpage of a search service provider, for instance google.com. At least some of the servers of the front end 101 are web servers.

[0026] High level operation of the system of Figure 1 will now be described with reference to Figure 2.

[0027] The operation of Figure 2 starts at step S1. At step S2, the front end 101 receives a search query from a user. Typically, step S2 involves receiving an http re-

quest from a browser application being used by the user, the http request including a search query that is presented into a search form provided by the browser application as a result of HTML code provided by the front end 101. Various alternative ways in which the front end 101 may be provided with a search query from a user will be apparent to the skilled person.

[0028] At step S3, the system runs search and a first ads (advertising) processing in parallel. This involves the search query being sent from the front end 101 to both the search server system 102 (as a search request) and the ads server system 103 (as a first advertisement request). The search request may be sent to the search server system 102 substantially simultaneously with the sending of the first advertisement request to the ads server system 103, or one may slightly follow the other. The first advertisement request sent to the ads server system 103 includes an instruction to provide an interim advertisement response. The first advertisement request is sent to a one of the ads servers 103a ... 103d that is selected by the load balancer 104.

[0029] At step S4, the front end 101 receives a response from the search server system 102 (as a search response) and receives a response from the ads server system 103 (as an interim advertisement response). The search response typically is received from the search server system 102 at a slightly different time to the receiving of the interim advertisement response from the ads server system 103.

[0030] At step S5, some of the search results provided by the search server system 102 and the interim advertisement response are provided by the front end 101 to the ads server system 103 as a second advertisement request. In particular, the second advertisement request is provided by the front end 101 to the load balancer 104, which allocates the request to an ads server 103a ... 103d. The load balancer 104 selected the particular ads server based on load balancing requirements and without regard to the ads server 103a ... 103d that processed the first ads request. Generally speaking, the ads server 103a ... 103d that processes the first advertisement request can be termed the first ads server and the ads server 103a ... 103d that processes the second advertisement request can be termed the second ads server.

[0031] The aspects of the search results provided by the search server system to the front end 101 that are selected by the front end 101 for sending to the ads server system 103 in the second advertisement request may be made in any suitable way, and some examples are described later in this specification. The second advertising request sent as part of step S5 includes an indication that a full advertisement response is to be provided.

[0032] At step S6, the second ads server of the ads server system 103 processes the second advertisement request, using the original search query and the contents of the second advertisement request (which includes the interim advertisement response provided by the first ads server). This processing involves calculating scores for

at least some of the advertisements included in the interim advertisement response, ranking them according to their score, and selecting a small number of highest ranked advertisements for the full advertisement response. The ads server system 103 then provides the resulting full advertisement response to the front end 101. A webpage including the search results provided by the search service system 102 and the advertisements provided by the ads server system 103 is prepared by the front end and is provided to the user, who views the webpage using their browser application. This webpage can be called the search response.

[0033] The operation ends at step S8.

[0034] Very briefly, the process described with reference to Figure 2 allows the advertisements provided in the search response webpage to the user to include advertisements that take into account the results of the processing of the search query by the search server system 102. Moreover, this is achieved relatively quickly. The relatively quick speed of provision is a result of the ads server 103 being able to partially process the search query in parallel with the search query being processed by the search server system 102. This is possible due to the contents of the advertisement requests, in particular the inclusion in the first advertisement request of an indication that an interim advertisement response is to be provided and an inclusion in the second advertisement request of the interim advertisement response and an indication that a full advertisement response is to be provided. The relatively quick speed is achieved in part also because of the configuration of the front end 101 and the ads server system 103 to provide part-processing of the search query by the ads server 103 and to complete the processing using the results of the search performed by the search server system 102.

[0035] The processing of the first and second advertisement requests by different advertisement servers 103a, 103b provides more flexibility for load balancing of the advertisement servers 103a ... 103d than would be possible if a single advertisement server processed both of the advertisement requests.

[0036] Further details and additional advantages will be apparent from the following description, which is to be read in accordance with the accompanying figures.

[0037] Detailed embodiments will now be described with reference to Figures 3, 4, 5 and 6. Figure 3 relates to steps performed by the front end 101, Figure 4 relates to steps performed by a first ads server 103a of the ads server system 103 and Figure 5 relates to steps performed by a second ads server 103b of the ads server system 103.

[0038] Referring firstly to Figure 3, the operation begins at step S1. At step S2, the search query is received from the user. This step was described above with reference to Figure 2.

[0039] At step S3, the front end 101 sends a first search request to the search server system 102 in a message. The sending of the first search request is indicated at S1

in Figure 1. The first search request may take any suitable form. For instance, it may include all of the text of the search query that was provided by the user and was received at step S2. Typically, the first search request does include all of the text of the search query received at step S2. The first search request may additionally include some context information. For instance, the context information may take the form of information relating to the user's current location, if this information is available. The context information may include information about content that is being displayed by a webpage in which the search query was entered by a user. For instance, if the search query was entered into a search text entry field provided in conjunction with content such as one or more maps or images or a third party website, the context information may include information identifying the related content.

[0040] At step S4, a first advertisement request is sent by the front end 101 to the ads server system 103 in a message. The sending of the first advertisement request is indicated at A2 in Figure 1. The first advertisement request can take the same form as the first search request that was sent at step S3. Alternatively, the first advertisement request may take a different form. For instance, the first advertisement request may include a subset of the information that was included in the first search request that was sent to the search server.

[0041] The first advertisement request prepared by the front end 101 and sent at step S4 includes an indication that an interim advertisement response, not a full advertisement response, is to be provided by the ads server system 103. This may be provided in any suitable way. For instance, it may take the form of a flag, or more generally a predetermined value in a predetermined field. The indication may take the form of text, or it may simply be data. Although not illustrated in Figure 3, the load balancer 104 responds to receiving the first advertisement request A1 from the front end 101 by choosing one of the ads servers 103a to 103d. The load balancer 104 chooses an ads server 103a ... 103d such as to achieve good balancing of the load placed on the various ads servers 103a ... 103d. In this example, the load balancer 104 chooses the first ads server 103a.

[0042] After sending the first search request to the search server 102 at step S3, the search server system 102 processes the first search request. This may be entirely conventional, and does not need to be explained here. The result of processing of the first search request by the search server system 102 is search results, that are sent in a search response message to the front end 101. This is indicated at S2 in Figure 1. The search response message including the search results are received from the search server system at the front end 101 at step S5 of Figure 3.

[0043] The search results received at the front end 101 from the search server system 102 at step S5 include information falling into two categories, and possibly also information falling into a third category.

[0044] Information falling into the first category is information that is presented in the search response webpage to the user. This information includes a URL, a text snippet and one or more site links. The URL is text that indicates the location/node on the worldwideweb to which the first site link points. The site link is a hyperlink to the URL that is indicated. The displayed text of the hyperlink typically is different to the URL, and for instance typically is descriptive. The text snippet is plain text that is derived from the webpage to which the particular search result relates. The text snippet typically includes between 10 and 20 words and about 100 or so characters, although this is merely an example. The text snippet is text derived from the webpage to which the particular search result relates and which has been determined by the search server system 102 as being particularly relevant to the search query.

[0045] The second category of information is information that is not displayed to a user in the search page. In almost all cases, this includes location information relating to the search result. The location information may for instance be an address, that is a street address or a PO box address, or latitude and longitude coordinates or such like. The information that is not displayed may additionally include entity information that is on the webpage to which the search result relates, for instance it may include categories that are relevant to the search result.

[0046] The optional other category of information is other elements such as a knowledge card, a map, a video, and other search queries.

[0047] The information described above is provided for each of plural search results. The number of search results that are included in the search results may be determined by the front end 101, for instance based on a preference setting of the user or based on some other information, or it may be determined by the search server system 102. A typical number of search results presented on a search response webpage is 10. The number of search results included in the search response typically is sufficient for a number of pages of search response webpage. For instance, 100 search results may be included in the search response.

[0048] The search response may also include a full page replacement, where the search server system 102 has determined that the search query may have included a spelling mistake. A full page replacement includes search results for a spell-corrected version of the search query, and indicates both the spell-corrected search query and the uncorrected search query. Search results for the uncorrected search query typically are not provided in a search response including a full page replacement.

[0049] Step S5 also involves the front end receiving the interim advertisement response A2 from the first ads server 103a, via the load balancer 104. The contents of the interim advertisement response A2 are described in more detail below. The interim advertisement response A2 typically is received at a slightly different time to the

search results.

[0050] At step S6, the front end 101 selects data from the search results received at step S5. The selection of data at step S6 involves selecting some of the data forming part of the search results received from the search server, and not selecting other data. This step may be performed in any suitable way.

[0051] For instance, if a knowledge card is present in search results, the knowledge card is not selected at step S6. Text snippets are selected at step S6, although in some embodiments they are not selected. Site links are not selected at step S6. Furthermore, full location information is not selected at step S6. URLs from the search results are selected.

[0052] The receiving at step S5 by the front end 101 of the interim advertisement response A2 from the first ads server 103a may happen during or after performance of step S6.

[0053] At step S7, a second advertisement request is prepared using the data that was selected at step S6 and including the whole or part of the interim advertisement response. The second advertisement request may include information relating to the plural search results.

[0054] For instance, if a knowledge card is present in the search response, the knowledge card is not selected at step S6. However, the front end 101 provides the second advertisement request with a flag indicating that a knowledge card is present in the search response. The flag may be of a Boolean representation. Furthermore, full location information is not selected at step S6. However, a flag indicating whether or not location information is present may be provided. A flag is provided for each search result, allowing determination of which search results have location information associated therewith. Also, information identifying the type of content present at the webpage linked to by the URL of a search result is included in the second advertisement request. The type of content may be indicated as for instance a video, a webpage, a news story or an image. The type of content is provided separately for each search result.

[0055] Where the search response indicates that a map is to be provided in the search response webpage, the second advertisement request can include information identifying the map area, for instance by defining the rectangular border of the map. The second advertisement request can additionally include information identifying when search results are located within the map area.

[0056] The second advertisement request includes data selected from each of the search results that were provided by the search server system 102 to the front end 101 at step S5. For instance, where ten search results were provided, the second advertisement request includes information relating to each of the ten separate search results, which may be quite different from one another, as well as the user-specific data. If a different (greater than 1) number of search results are provided, the request includes information relating to each of the

search results. Additionally, the search query to which the search results relate, this being the search query that was received by the front end 101 at step S2, is included in the second advertisement request.

[0057] The second advertisement request also includes an indication that a full advertisement response is to be provided by the ads server system 103. This can be achieved in any suitable way. For instance, it may involve including a flag having an opposite value to the flag used in the first advertisement request that was sent at step S4.

[0058] Following preparation of the second advertisement request, it is sent to the ads server system 103 at step S7 by the front end 101. This is illustrated at A3 in Figure 1. Although not illustrated in Figure 3, the load balancer 104 responds to receiving the second advertisement request A3 from the front end 101 by choosing one of the ads servers 103a to 103d. As with the first advertisement request, the load balancer 104 chooses an ads server 103a ... 103d such as to achieve good balancing of the load placed on the various ads servers 103a ... 103d. In this example, the load balancer 104 chooses the second ads server 103b to process the second advertisement request.

[0059] Following step S7, the front end 101 waits for a full advertisement response from the ads server system 103. The full advertisement response is indicated at A4 in Figure 1. When the full advertisement response is received at step S8, the front end 101 continues with the operation of Figure 3. In particular, at step S9 the front end 101 combines information from the search response received from the search server system 102 at step S5 with information from the full advertisement response received from the second ads server 103b of the ads server system 103 at step S8 into a search response webpage. The search response webpage is then provided at step S10 to the user, and is viewed by the user through their browser application.

The operation ends at step S11.

[0060] Operation of the first ads server 103a of the ads server system 103 will now be described with reference to Figure 4. Operation begins at step S1. At step S2, the ads server system 103 receives the first advertisement request. This is the first advertisement request that was sent by the front end 101 at step S4 of Figure 3.

[0061] At step S3, the ads server system 103 searches for advertisements using the information included in the first advertisement request. This step may be performed in a conventional way. The result of step S3 is a number of advertisements that may be of interest to the user. For instance, the result of step S3 may be some dozens of advertisements, some hundreds of advertisements, a thousand advertisements or a few thousand advertisements.

[0062] At steps S4 and S5, the advertisements are scored then ranked. A score is attributed to each of the

advertisements at step S4, then at step S5 the advertisements are ranked according to their score. These steps may be performed conventionally.

[0063] For instance, attributing a score to an advertisement at step S4 may involve applying a function of three parameters, which can be represented as follows:

$$\text{Score} = f(\text{bid}, \text{PCTR}, \text{relevance})$$

[0064] Here, the numerical value of the bid parameter is a value provided by an advertiser in advance, through their advertising account with the search service provider. The provision of a bid value for an advertisement is provided by the retrieve subsystem 105. The operation involves the ads server system 103 sending a request R1 for a bid for an advertisement to the retrieve subsystem 105. The retrieve subsystem 105 then calculates a bid value and sends it at R2 to the ads server system 103. The calculation of the bid value by the retrieve subsystem 105 may be performed in any suitable way, for instance conventionally.

[0065] PCTR is predicted click-through rate, and has a numerical value. A PCTR for a given advertisement is calculated by the PCTR subsystem 106. The PCTR may be calculated in any suitable way. The procedure is that the ads server system 103 sends P1 a request for a PCTR for an advertisement to the PCTR subsystem 106. The PCTR subsystem 106 then calculates a PCTR value for the advertisement, which can be performed in any suitable way. The PCTR value for the advertisement then is returned to the ads server system 103 by P2 in Figure 1.

[0066] The numerical value of the relevance parameter is provided by the relevance score subsystem 107. This may be performed in any suitable way, for instance in a conventional manner. The procedure is that the ads server system 103 sends a relevance score RS1 request to the relevance score subsystem 107. The relevance score subsystem then calculates a relevance score for the advertisement and sends it at RS2 to the ads server system 103.

[0067] After a score has been calculated for each of the advertisements, using the function of the three parameters, the advertisements are ranked at step S5. Step S5 may involve physically organising the data relating to the advertisements such that higher ranked advertisements are physically located in memory together. Alternatively, the ranking of advertisements at step S5 may merely involve deleting or marking for deletion advertisements which have a score that is so low that the advertisement does not qualify to be included in the ranked advertisements.

[0068] At step S6, the first ads server 103a selects a number of the highest ranked ads for inclusion in the interim advertisement response.

[0069] The number of ads that are selected for inclu-

sion in the interim advertisement response may be fixed or it may be dynamic. The number of ads that are selected for inclusion in the interim advertisement response may for instance be fixed at 250, 500, 750 or 1000. It may alternatively be dynamic and based on the scores allocated to advertisements. For instance, the number of ads that are selected for inclusion in the interim advertisement response may be equal to the number of ads that have a score greater than a predetermined proportion of the advertisement with the highest score. The predetermined proportion may for instance be 0.8, giving rise to all ads that have a score at least equal to 80% of the highest score. The ads that are selected for inclusion in the interim advertisement response may alternatively be all the ads with the same or higher score as a particular ad, for instance the 250th, 500th, 750th or 1000th highest ranked ad. This can result in a variable number of ads being selected, although the number may not vary significantly on different occasions.

[0070] At step S5, the content of the advertisements that is to be included in the interim advertisement response is selected.

[0071] In one option, the whole of the content of the advertisements, as stored in the ads server 103a, is selected for inclusion in the interim advertisement response. Alternatively, only some of the content of the advertisements, as stored in the ads server 103a, is selected for inclusion in the interim advertisement response. By omitting content of the advertisements from the interim advertisement response, utilisation of bandwidth and memory can be reduced. However, the removal of relevant content from the advertisements would reduce the ability of the system 100 to select the best advertisement(s) for display to the user with the search results. For this reason, it can be important to select carefully the content that is included in the interim advertisement result so as not to omit content that is likely to be useful.

[0072] An example of content from the advertisements selected for inclusion in the interim advertisement response will now be described.

[0073] Firstly, full creative text is selected. This includes Lines 1, 2, and 3 of the advertisement that is displayed, if the advertisement is selected for display to the user.

[0074] Secondly, the parameter MaxCPC (maximum cost-per-click) is selected. This parameter indicates the maximum cost that the advertiser is willing to spend to display the advertisement. This parameter may also be referred to as the bid.

[0075] Thirdly, the parameter PCTR is selected. This is Google's prediction of how likely is the user to click on a given advertisement, and is discussed above.

[0076] Fourthly, an advertisement quality parameter is selected. This parameter is a measure of how relevant the advertisement is for the search query.

[0077] Fifthly, the landing page is selected. This is the page that the user is taken to if the advertisement is pre-

sented to the user and the user selects it by clicking on it.

[0078] Sixthly, related advertisements are selected. This includes all of the above information for advertisements that are related to the advertisement that has been selected because of its sufficiently high ranking.

[0079] Of these, the data that is most expensive in terms of bandwidth and memory utilisation is the landing page, the related ads, and the creative text.

[0080] The quantity of data that constitutes the interim advertising response can be reduced by precomputing information that is needed. For instance, instead of including the entire landing page, all unique words in the landing page and optionally their count (the number of times that the words appear) may be selected for inclusion in the interim advertising response. Alternatively or additionally, the number of lines of Creative text may vary. Where only some of the lines of Creative text can be included in the first advertisement response, the quality of the lines of Creative text is assessed and the lines with the highest quality are chosen to be included in the first advertisement response. These alternatives provide improved performance, but makes it more difficult to change the relevant algorithms later.

[0081] The quantity of data that forms the first advertisement response is a function of the content of the advertisements that are selected for inclusion in the response and the number of advertisements that are included in the response. These variables are typically fixed or vary only slightly in a particular implementation. However, more content per advertisement and greater numbers of advertisements gives improved advertising performance, at the expense of higher bandwidth, memory and processing utilisation.

[0082] At step S8, the interim advertisement response is prepared, including the selected content for the selected number of advertisements, and sent to the front end 101 via the load balancer 104.

The operation ends at step S9.

[0083] Operation of the second ads server 103b will now be described with reference to Figure 5.

[0084] The operation starts at step S1. At step S2, the second advertisement request is received from the front end 101, via the load balancer 104. As discussed above, the second advertisement request includes the interim advertisement response, an indication that a full advertisement response is to be provided, the search query and selected aspects of the search results that were provided by the search server system to the front end 101.

[0085] At step S3, the advertisements from the interim advertisement response are extracted from the second advertisement request. As discussed above, this includes a selected portion of the content of the advertisements.

[0086] After extracting the advertisements, the operation continues to step S4. Step S4 is an optional step of performing further searching for advertisements. Step S4

is not a repeat of step S3 of Figure 4; instead it is a significantly more focussed and shorter duration search. The further searching performed in step S4 may for instance be based on a small number of the highest search results included in the second advertisement request. For instance, the further searching performed at step S4 may be based on the top (first) one of the search results included in the second advertisement request.

[0087] For instance, a search query of "highest mountain in the world" may produce from the search server system 102 a number of search results including a top (first) result relating to an online encyclopaedia entry for Mount Everest. The search query the search result of "Mount Everest" are received in the second advertisement request at step S2. In this case, step S4 may involve performing further searching in respect of "Mount Everest", resulting in one or more advertisements for organised tours or vacations to Mount Everest.

[0088] Advertisements found during the further search in step S4 are added to the list of advertisements extracted from the second advertisement request.

[0089] At step S5, the scores of advertisements, and thus potentially their ranking, is changed by the ads server system 103. As shown in Figure 5, there are three aspects to this step. The first is modifying the PCTR at step S5.1. The second is modifying the relevance score at step S5.2. The third is modifying the bid at step S5.3. Changing the score/ranking of ads at step S5 may involve just one of the options of steps S5.1 to S5.3. Alternatively, it may involve two of the options of steps S5.1 to S5.3. For instance, it may involve modifying the PCTR and modifying the relevance score. Alternatively, step S5 may involve all three of the options of step S5.1 to S5.3.

[0090] Step S5 is performed separately for each advertisement.

[0091] The ads server system 103 may modify the value of PCTR for an advertisement at step S5.1 in one of a number of different ways. For instance, the PCTR of an advertisement is changed depending on the user interface elements that are indicated in the second advertisement request. For a given advertisement, the PCTR may be modified by the ads server system 103 depending on whether a map is indicated as being a user interface element that is present in the search results. As indicated above, the second advertisement request does not include any maps, but can include an indication of whether a map is to be provided. The PCTR may be modified upwards or downwards, that is it may be increased or decreased, depending on whether a map is to be provided with the search results. The particular algorithm for modifying the PCTR depending on whether or not a map is to be provided can take any suitable form.

[0092] Similarly, the PCTR for an advertisement can be changed depending on whether the search response includes a knowledge card. As indicated above, the presence or absence of a knowledge card in the search response is indicated in the second advertisement request.

[0093] Additionally, the PCTR for an advertisement

may be modified by the ads server system 103 depending on the number of images that are present in the search results, as indicated in the second advertisement request.

[0094] In the case of modifying the PCTR depending on whether there is a knowledge card in the search results and how many images are present in the search results may result in the PCTR being increased or decreased, depending on the choice of algorithm.

[0095] Modifying the relevance score of an advertisement at step S5.2 can take any suitable form. For instance, for a search query relating to "car insurance", the top search result may be an insurance provider such as "Example Car Insurance". In this case, step S5.2 may modify the relevance score of advertisements that relate to "Example Car Insurance", in particular by giving them a higher relevance score. Step S5.2 may or may not involve reducing the relevant score of advertisements that do not lead to "Example Car Insurance".

[0096] Modifying the relevance at step S5.2 may involve increasing the relevance score for advertisements that relate to a physical location that is relatively proximate to a location of the top search result. For instance, a top search result relating to a particular theatre in London may result in step S5.2 increasing the relevance score for advertisements relating to restaurants that are located geographically close to the physical location of the theatre.

[0097] If the second advertisement request includes snippets for the search results, modifying the relevant score at step S5.2 may involve increasing the relevance score for advertisements that include a relatively large amount of text in common with the snippets of the top one or more search results.

[0098] Modifying the bid for an advertisement at step S5.3 can be performed in one of a number of ways. For instance, advertisers may specify with the search services provider that their bids for their advertisements are modified depending on search results that are to be provided to the user in the search response webpage. For instance, an advertiser may specify that their bid for an advertisement is to be increased from value x to value y if the search results resulting from a search query include a particular advertiser, which may for instance be the bidding advertiser or may be a third party advertiser, for instance a competitor of the bidding advertiser. For instance, an advertisement for a flower delivery service may be specified by the advertiser to have a bid x associated therewith and for the bid to be modified to a value y if the search results for a search query include flower delivery services of a particular competitor to the bidding advertiser.

[0099] It will be appreciated that modifying the PCTR at step S5.1, modifying relevance at step S5.2, and modifying bid at step S5.3 is performed for at least some of the advertisements in the list. As such, the score for at least some of the advertisements is changed by performance at step S5. Consequently, the ranking of the adver-

tisements will be changed as a result of performance at step S5 in most, if not all, instances.

[0100] It will be appreciated also that modifying the PCTR at step S5.1, modifying relevance at step S5.2, and modifying bid at step S5.3 is performed using information related to only some of the search results included in the search response. For instance, modifying the PCTR at step S5.1, modifying relevance at step S5.2, and modifying bid at step S5.3 is performed using information related to only three or five of the search results included in the search response.

[0101] As is conventional, one or more highest rank advertisements are provided in the search response webpage to the user by the front end 101. As such, modifying the score of advertisements in step S5 can result in different advertisements being provided to the user. Advantageously, these advertisements have been selected taking into account not only the search query but also the search results, as provided by the search server system 102, that are to be provided alongside the advertisements in the webpage to the user. Thus, more information is taken into account in the provision of advertisements than is possible on prior art systems. Moreover, this is achieved with a relatively small additional delay since the searching for advertisements and much of the processing of the advertisements by the ads server system 103 is performed whilst the search server system 102 is searching for the relevant search results. There is some additional delay in the provision of the search response webpage to the user but the additional delay is relatively small, resulting only from step S5 and optionally steps S4 and S6, and is considered to be an acceptable additional delay considering the benefits.

[0102] Following step S5, there is an optional step of changing the visual appearance of advertisements at step S6. The changing of the visual appearance of the advertisements takes into account the content of the search results received as part of the second advertisement request received at step S2. For instance, if search results have site links, step S6 may involve displaying more site links for a given advertisement. Alternatively or additionally, if a number of top search results prominently feature location information, step S6 may involve changing the visual appearance of the advertisements that are to be provided in the search response webpage such that locations within the advertisements are shown more prominently. Step S6 may alternatively involve making a determination to show extensions of advertisements whereas otherwise they would not have been shown. These extensions can include map extensions or video extensions etc. Map extensions of advertisements can be determined to be shown at step S6 where for instance the top search results include a relatively high amount of location information. A decision to show video extensions may be made at step S6 where the top search results include a relatively high amount of video content. Alternatively, step S6 may involve determining to show extensions such as map extensions and video

extensions more prominently than otherwise they would have been shown in the search results provided to the user.

[0103] Step S5 provides scores for the advertisements in the list, which comprises the advertisements received in the second advertisement request (which were provided by the first ads server 13a in response to the first advertisement request) and any advertisements added by the optional further searching step S4.

[0104] Next, the second ads server 103b ranks the advertisements according to their new scores. The ranking is as described above with reference to step S5 of Figure 4. However, the scores calculated by the second ads server 103b in performing the ranking will be different to the scores obtained by the first ad server 103a for many of the advertisements because the scoring of the advertisements here takes into account also the selected parts of the search response. As such, the highest ranked advertisements will be different in many cases.

[0105] The second ads server 103b selects a small number of highest ranked advertisements for the full advertisement response. The number of advertisements is selected by the ads server system 103 depending on a number of factors, and this may be performed in a conventional manner. The number of highest ranked advertisements for the full advertisement response is a lot lower than that number of highest ranked advertisements selected for the interim advertisement response. The number of highest ranked advertisements for the full advertisement response typically is at least 100 times lower than that number of highest ranked advertisements selected for the interim advertisement response. This ratio allows an appropriately high number of advertisements to be considered when processing the second advertisement request whilst providing a manageable number of advertisements in the full advertisement response for use by the front end 101.

[0106] It will be understood that the changing of the visual appearance at step S6 may instead be performed after selecting the highest ranking ads at step S8. In this way, step S6 need be performed only for ads that have been selected for inclusion in the full advertisement response.

[0107] At step S9, the ads server system 103 prepares and sends an advertisement response to the front end 101. This is shown at A4 in Figure 1. The content of the advertisement included in the advertisement response sent at step S9 may be conventional. The content of the advertisements may include text, URLs and site links. The content of the advertisements may also include other content such as video, map content etc. The advertisement response may also include information that allows the front end 101 to determine how to show the corresponding advertisements. In particular, the advertisement response may include information identifying what site links are to be displayed, what locations are to be displayed and in what format, and whether extensions are to be displayed and if so how they are to be displayed.

The advertisement response may be the same as in conventional systems. However, there is a difference in that the selection of advertisements included in the advertisement response takes account of the search results provided by the search server system 102, in particular by changing the score and thus ranking of advertisements through implementation of step S5 of Figure 5.

[0108] The operation ends at step S10.

[0109] Figure 6 illustrates schematically some internal components of the front end 101 and the ads server 103a. The other ads servers 103b to 103d are substantially the same as the first ads server 103a.

[0110] The front end 101 includes at least one processor 101P, at least one volatile memory 101V and at least one non-volatile memory 101N. Each is connected to a bus 101B.

[0111] Within the non-volatile memory 101N are stored an operating system OS and one or more software applications App. The non-volatile memory may be read only memory (ROM), such as for instance a hard disk drive, or flash memory, optical storage, tape storage etc. Other non-volatile memories may be included, and are illustrated schematically in the figure.

[0112] The volatile memory 101V may be for instance random access memory (RAM), flash memory etc. Multiple volatile memories may be included, and are illustrated in Figure 6.

[0113] The processor 101P may for instance be a general purpose processor. It may be a single core device or a multiple core device. The processor 101P may be a central processing unit (CPU) or a general processing unit (GPU). Alternatively, it may be a more specialist unit, for instance a RISC processor or programmable hardware with embedded firmware. Multiple processors 101P may be included in the front end 101, and are illustrated as such in Figure 6. The processor 101P may be termed processing means.

[0114] Generally speaking, the processor 101P executes one or more applications App using the operating system OS, both of which are stored permanently or semi-permanently in the non-volatile memory 101N, using the volatile memory 101V temporarily to store software forming a whole or part of the operating system OS and the applications App and also temporarily to store data generated during execution of the software.

[0115] The first ads server 103a is similarly constructed. In particular, the first ads server 103a includes at least one processor 101P, at least one volatile memory 101V and at least one non-volatile memory 101N. Each is connected to a bus 101B.

[0116] Within the non-volatile memory 103N are stored an operating system OS and one or more software applications App. The non-volatile memory may be read only memory (ROM), such as for instance a hard disk drive, or flash memory, optical storage, tape storage etc. Other non-volatile memories may be included, and are illustrated schematically in the figure.

[0117] The volatile memory 103V may be for instance

random access memory (RAM), flash memory etc. Multiple volatile memories may be included, and are illustrated in Figure 6.

[0118] The processor 103P may for instance be a general purpose processor. It may be a single core device or a multiple core device. The processor 103P may be a central processing unit (CPU) or a general processing unit (GPU). Alternatively, it may be a more specialist unit, for instance a RISC processor or programmable hardware with embedded firmware. Multiple processors 103P may be included in the first ads server 103a, and are illustrated as such in Figure 6. The processor 103P may be termed processing means.

[0119] Generally speaking, the processor 103P executes one or more applications App using the operating system OS, both of which are stored permanently or semi-permanently in the non-volatile memory 103N, using the volatile memory 103V temporarily to store software forming a whole or part of the operating system OS and the applications App and also temporarily to store data generated during execution of the software.

[0120] It will be appreciated that the above-described embodiments are not limiting on the scope of the invention, which is defined by the appended claims and their alternatives. Various alternative implementations will be envisaged by the skilled person, and all such alternatives are intended to be within the scope of the claims.

[0121] For instance, although in the above it is the second advertisement request that includes an indication that a full response is required, the invention is not limited to this. In other implementations, it is a third or subsequent request that includes the indication that a full response is required. The second advertisement request may include further information that can be used in the search and/or ranking of candidate advertisements, in which case the modifying of the score of advertisements may be a two-stage process. In the above, the first advertisement server 103a processes the first advertisement request and provides the interim advertisement response, and the second advertisement server 103b processes the second advertisement request and provides the full advertisement response. The choice of advertisement server 103a, 103b to perform the different tasks is performed by the load balancer 104. Advantageously, various advertisement servers 103a ... 103d are configured to be able both to process first advertisement requests and provide interim advertisement responses, and to process second advertisement requests and provide full advertisement responses. Alternatively, some advertisement servers 103a ... 103d are configured to be able to process first advertisement requests and provide interim advertisement responses and are not configured to process second advertisement requests and provide full advertisement responses. Here, other advertisement servers 103a ... 103d are configured not to be able to process first advertisement requests and provide interim advertisement responses, but are configured to process second advertisement requests and provide full adver-

tisement responses.

[0122] In the above, the entirety of the list of advertisements received at the front end 101 in the first advertisement response is included in the second advertisement request. Additionally, the content of the advertisements received at the front end 101 in the first advertisement response is included in the second advertisement request. In alternative implementations, the front end 101 may perform some filtering of the advertisements. For instance, the front end 101 may select only some of the advertisements included in the first advertisement response for inclusion in the second advertisement request. Selection may be based on some criteria, for instance a current loading of the front end 101, e.g. advertisements may be filtered out of the front end 101 is under high load conditions. Alternatively or additionally, the front end 101 may select only some of the content of advertisements included in the first advertisement response for inclusion in the second advertisement request. Selection may be based on the same or a different criteria, for instance a current loading of the front end 101, e.g. advertisements may be filtered out of the front end 101 is under high load conditions.

[0123] In the above, a score is calculated by the second advertisement server 103b for each of the advertisements included in the second advertisement request. In alternative implementations, the front end 101 may calculate a score for only some of the advertisements included in the second advertisement request. In particular, the front end 101 may perform an initial, shallow analysis and on the basis of the analysis identify advertisements filter out some advertisements prior to calculating a score for the remaining advertisements. For instance, the initial analysis may involve filtering out all advertisements that do not have a location parameter if the top three search results are all heavily location-oriented results.

[0124] Embodiments of the present invention may be implemented in software, hardware, application logic or a combination of software, hardware and application logic. The software, application logic and/or hardware may reside on memory, or any computer media. In an example embodiment, the application logic, software or an instruction set is maintained on any one of various conventional computer-readable media. In the context of this document, a "computer-readable medium" may be any media or means that can contain, store, communicate, propagate or transport the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer.

[0125] A computer-readable medium may comprise a computer-readable storage medium that may be any tangible media or means that can contain or store the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer as defined previously.

[0126] According to various embodiments of the previous aspect of the present invention, the computer program according to any of the above aspects, may be

implemented in a computer program product comprising a tangible computer-readable medium bearing computer program code embodied therein which can be used with the processor for the implementation of the functions described above.

[0127] Reference to "computer-readable storage medium", "computer program product", "tangibly embodied computer program" etc. or a "processor" or "processing circuit" etc. should be understood to encompass not only computers having differing architectures such as single/multi processor architectures and sequencers/parallel architectures, but also specialised circuits such as field programmable gate arrays FPGA, application specific circuits, and other devices. References to computer program, instructions, code etc. should be understood to express software for a programmable processor firmware such as the programmable content of a hardware device as instructions for a processor or configured or configuration settings for a fixed function device, gate array, programmable logic device, etc.

[0128] If desired, the different functions discussed herein may be performed in a different order and/or concurrently with each other. Furthermore, if desired, one or more of the above-described functions may be optional or may be combined.

[0129] Although various aspects of the invention are set out in the independent claims, other aspects of the invention comprise other combinations of features from the described embodiments and/or the dependent claims with the features of the independent claims, and not solely the combinations explicitly set out in the claims.

Claims

1. A system for providing advertisements with search results in response to a search query, the system comprising a front end and at least first and second advertisement servers, wherein:

the front end is configured:

to receive a search query; and
to send a search request to a search server and to send a first advertisement request to an advertisement server, wherein the search request includes the search query or information based on the search query, and wherein the first advertisement request includes the search query or information based on the search query and an indication that an interim advertisement response is to be provided;

the first advertisement server is configured:

in response to receiving the first advertisement request, to search for advertisements

related to the search query to produce plural advertisement results;

to select a plurality of the plural advertisements;

to prepare an interim advertisement response including some or all content of the selected plural advertisements; and

to send the interim advertisement response to the front end;

the front end is configured:

to receive search results from the search server;

to receive the interim advertisement response from the first advertisement server; and

to send at least some of the search results and at least some of the interim advertisement response to the advertisement server in a second advertisement request, wherein the second advertisement request includes an indication that a full advertisement response is to be provided;

the second advertisement server is configured:

to receive the second advertisement request;

to calculate a score for plural ones of the advertisements included in the interim advertisement response to produce plural advertisement results each with an associated score, the score for some of the plural ones of the advertisements being based on the search results included in the second advertisement request;

to rank the plural advertisement results according to their scores;

to select one or more of the highest ranked plural advertisement results; and

to send a full advertisement response to the front end, the full advertisement response including the selected one or more highest ranked plural advertisement results; and

the front end is configured:

to provide the search results with the selected one or more highest ranked plural advertisement results.

2. A system as claimed in claim 1, wherein the second advertisement server is configured to respond to receiving the second advertisement request by performing an additional search for advertisements using information forming part of the second advertisement request.

3. A system as claimed in claim 1 or claim 2, wherein the second advertisement request includes a predicted click-through rate parameter value for each of the plural ones of the advertisements and wherein the second advertisement server is configured to modify the predicted click-through rate parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements.
4. A system as claimed in claim 3, wherein the second advertisement server is configured to modify the score of at least one of the plural advertisement results by modifying the predicted click-through rate of at least one of the plural advertisement results depending on user interface elements that are indicated in the search results included in the second advertisement request.
5. A system as claimed in any preceding claim, wherein the second advertisement request includes a bid parameter value for each of the plural ones of the advertisements and wherein the second advertisement server is configured to modify the bid parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements.
6. A system as claimed in any preceding claim, wherein the second advertisement request includes a relevance score parameter value for each of the plural ones of the advertisements and wherein the second advertisement server is configured to modify the relevance score parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements.
7. A system as claimed in claim 6, wherein the second advertisement server is configured to modify the relevance score parameter value of at least one of the plural advertisement results based on content of the top one of multiple search results included in the second advertisement request.
8. A system as claimed in claim 6 or claim 7, wherein the second advertisement server is configured to modify the relevance score parameter value of at least one of the plural advertisement results based on a location of the top one of multiple search results included in the second advertisement request.
9. A system as claimed in any preceding claim, wherein the number of advertisements included in the interim advertisement response is at least equal to 250, at least equal to 500, or at least equal to 740 or at least equal to 1000.
10. A system as claimed in any preceding claim, wherein the number of advertisements included in the interim advertisement response is at least 100 times greater than the number of advertisements included in the full advertisement response.
11. A system as claimed in any preceding claim, wherein the front end is configured to process the search results received from the search server and, for the at least some of the search results, to include some but not all of the information comprising the search results in the second advertisement request.
12. A system as claimed in any preceding claim, wherein the front end is configured to include in the second advertisement request one or more of:
- content type information;
 - map information indicating a map area;
 - information identifying the presence or absence of a knowledge card; and
 - information specific to the user.
13. A system as claimed in any preceding claim, wherein the second advertising server is configured to modify visual appearance characteristics of one or more advertisements based on the search results included in the second advertisement request.
14. A method of providing advertisements with search results in response to a search query, the method comprising:
- a front end:
 - receiving a search query; and
 - sending a search request to a search server and sending a first advertisement request to an advertisement server, wherein the search request includes the search query or information based on the search query, and wherein the first advertisement request includes the search query or information based on the search query and an indication that an interim advertisement response is to be provided;
 - a first advertisement server:
 - in response to receiving the first advertisement request, searching for advertisements related to the search query to produce plural advertisement results;
 - selecting a plurality of the plural advertisements;

preparing an interim advertisement response including some or all content of the selected plural advertisements; and
 sending the interim advertisement response to the front end;

the front end:

receiving search results from the search server;
 receiving the interim advertisement response from the first advertisement server; and
 sending at least some of the search results and at least some of the interim advertisement response to the advertisement server in a second advertisement request, wherein the second advertisement request includes an indication that a full advertisement response is to be provided;

a second advertisement server:

receiving the second advertisement request;
 calculating a score for plural ones of the advertisements included in the interim advertisement response to produce plural advertisement results each with an associated score, the score for some of the plural ones of the advertisements being based on the search results included in the second advertisement request;
 ranking the plural advertisement results according to their scores;
 selecting one or more of the highest ranked plural advertisement results; and
 sending a full advertisement response to the front end, the full advertisement response including the selected one or more highest ranked plural advertisement results; and

the front end:

providing the search results with the selected one or more highest ranked plural advertisement results.

15. A computer program comprising machine readable instructions that when executed control a system comprising a front end and first and second advertisement servers to perform a method as claimed in claim 14.

Amended claims in accordance with Rule 137(2) EPC.

1. A system for providing advertisements with search results in response to a search query, the system comprising a front end (101) and at least first and second advertisement servers (103a, 103b), wherein:

the front end is configured:

to receive (Fig.3 S2) a search query; and
 to send (Fig.3 S3) a search request to a search server (102) and to send a first advertisement request to an advertisement server, wherein the search request includes the search query or information based on the search query, and wherein the first advertisement request includes the search query or information based on the search query and an indication that an interim advertisement response is to be provided;

the first advertisement server is configured:

in response to receiving the first advertisement request, to search (Fig.4 S3) for advertisements related to the search query to produce plural advertisement results;
 to select (Fig.4 S6) a plurality of the plural advertisements;
 to prepare (Fig.4 S7, S8) an interim advertisement response including some or all content of the selected plural advertisements; and
 to send (Fig.4 S8) the interim advertisement response to the front end;

the front end is configured:

to receive (Fig.3 S5) search results from the search server;
 to receive (Fig.3 S5) the interim advertisement response from the first advertisement server; and
 to send (Fig.3 S7) at least some of the search results and at least some of the interim advertisement response to the advertisement server in a second advertisement request, wherein the second advertisement request includes an indication that a full advertisement response is to be provided;

the second advertisement server is configured:

to receive (Fig.5 S2) the second advertisement request;
 to calculate (Fig.5 S5) a score for plural

ones of the advertisements included in the interim advertisement response to produce plural advertisement results each with an associated score, the score for some of the plural ones of the advertisements being based on the search results included in the second advertisement request; to rank (Fig.5 S7) the plural advertisement results according to their scores; to select (Fig.5 S8) one or more of the highest ranked plural advertisement results; and to send (Fig.5 S9) a full advertisement response to the front end, the full advertisement response including the selected one or more highest ranked plural advertisement results; and

the front end is configured:

to provide (Fig.3 S10) the search results with the selected one or more highest ranked plural advertisement results.

2. A system as claimed in claim 1, wherein the second advertisement server is configured to respond to receiving the second advertisement request by performing an additional search for advertisements using information forming part of the second advertisement request.
3. A system as claimed in claim 1 or claim 2, wherein the second advertisement request includes a predicted click-through rate parameter value for each of the plural ones of the advertisements and wherein the second advertisement server is configured to modify the predicted click-through rate parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements.
4. A system as claimed in claim 3, wherein the second advertisement server is configured to modify the score of at least one of the plural advertisement results by modifying the predicted click-through rate of at least one of the plural advertisement results depending on user interface elements that are indicated in the search results included in the second advertisement request.
5. A system as claimed in any preceding claim, wherein the second advertisement request includes a bid parameter value for each of the plural ones of the advertisements and wherein the second advertisement server is configured to modify the bid parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the

scores for the advertisements.

6. A system as claimed in any preceding claim, wherein the second advertisement request includes a relevance score parameter value for each of the plural ones of the advertisements and wherein the second advertisement server is configured to modify the relevance score parameter value of at least one of the plural advertisement results depending on the search results included in the second advertisement request prior to calculating the scores for the advertisements.
7. A system as claimed in claim 6, wherein the second advertisement server is configured to modify the relevance score parameter value of at least one of the plural advertisement results based on content of the top one of multiple search results included in the second advertisement request.
8. A system as claimed in claim 6 or claim 7, wherein the second advertisement server is configured to modify the relevance score parameter value of at least one of the plural advertisement results based on a location of the top one of multiple search results included in the second advertisement request.
9. A system as claimed in any preceding claim, wherein the number of advertisements included in the interim advertisement response is at least equal to 250, at least equal to 500, or at least equal to 750 or at least equal to 1000.
10. A system as claimed in any preceding claim, wherein the number of advertisements included in the interim advertisement response is at least 100 times greater than the number of advertisements included in the full advertisement response.
11. A system as claimed in any preceding claim, wherein the front end is configured to process the search results received from the search server and, for the at least some of the search results, to include some but not all of the information comprising the search results in the second advertisement request.
12. A system as claimed in any preceding claim, wherein the front end is configured to include in the second advertisement request one or more of:
 - content type information;
 - map information indicating a map area;
 - information identifying the presence or absence of a knowledge card; and
 - information specific to the user.
13. A system as claimed in any preceding claim, wherein the second advertising server is configured to modify

visual appearance characteristics of one or more advertisements based on the search results included in the second advertisement request.

14. A method of providing advertisements with search results in response to a search query, the method comprising:

a front end (101):

receiving (Fig.3 S2) a search query; and
 sending (Fig.3 S3) a search request to a search server (102) and sending a first advertisement request to an advertisement server, wherein the search request includes the search query or information based on the search query, and wherein the first advertisement request includes the search query or information based on the search query and an indication that an interim advertisement response is to be provided;

a first advertisement server (103a):

in response to receiving the first advertisement request, searching (Fig.4 S3) for advertisements related to the search query to produce plural advertisement results;
 selecting (Fig.4 S6) a plurality of the plural advertisements;
 preparing (Fig.4 S7, S8) an interim advertisement response including some or all content of the selected plural advertisements; and
 sending (Fig.4 S8) the interim advertisement response to the front end;

the front end:

receiving (Fig.3 S5) search results from the search server;
 receiving (Fig.3 S5) the interim advertisement response from the first advertisement server; and
 sending (Fig.3 S7) at least some of the search results and at least some of the interim advertisement response to the advertisement server in a second advertisement request, wherein the second advertisement request includes an indication that a full advertisement response is to be provided;

a second advertisement server (103b):

receiving (Fig.5 S2) the second advertisement request;
 calculating (Fig.5 S5) a score for plural ones of the advertisements included in the interim

advertisement response to produce plural advertisement results each with an associated score, the score for some of the plural ones of the advertisements being based on the search results included in the second advertisement request;
 ranking (Fig.5 S7) the plural advertisement results according to their scores;
 selecting (Fig.5 S8) one or more of the highest ranked plural advertisement results; and
 sending (Fig.5 S9) a full advertisement response to the front end, the full advertisement response including the selected one or more highest ranked plural advertisement results; and

the front end:

providing (Fig.3 S10) the search results with the selected one or more highest ranked plural advertisement results.

15. A computer program comprising machine readable instructions that when executed control a system comprising a front end and first and second advertisement servers to perform a method as claimed in claim 14.

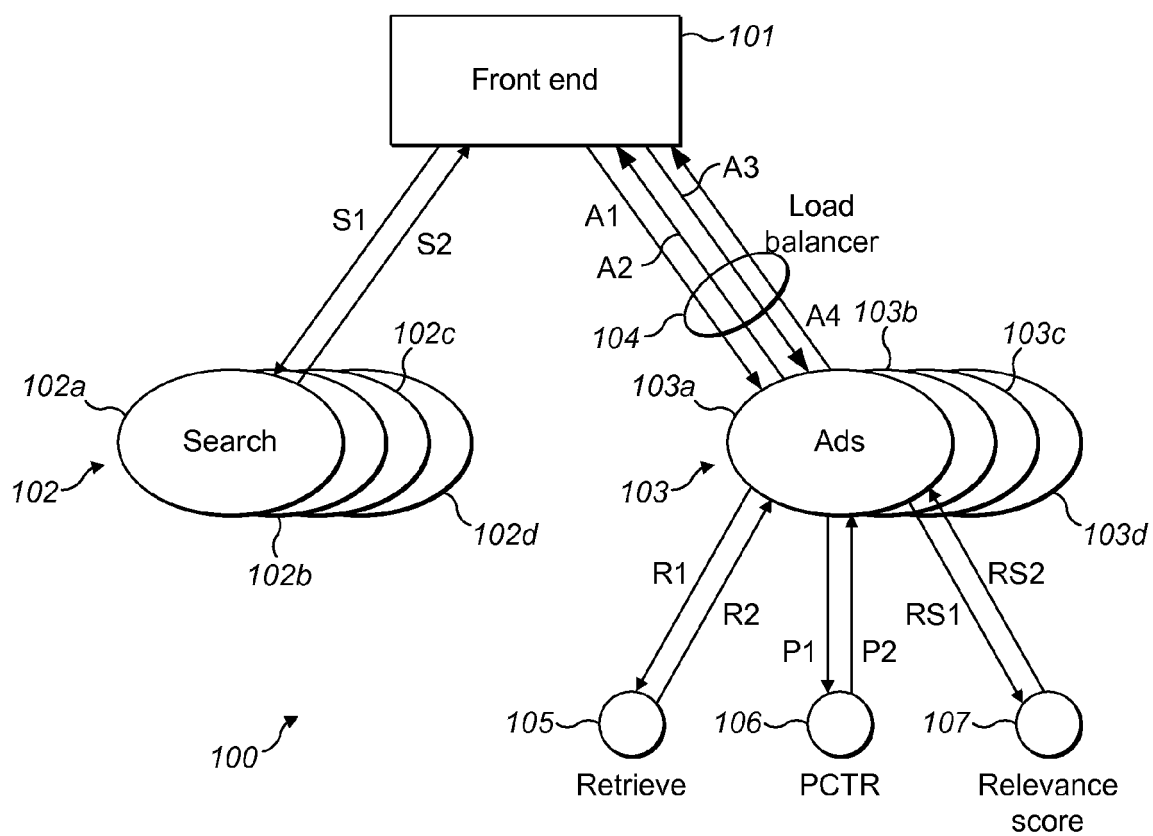
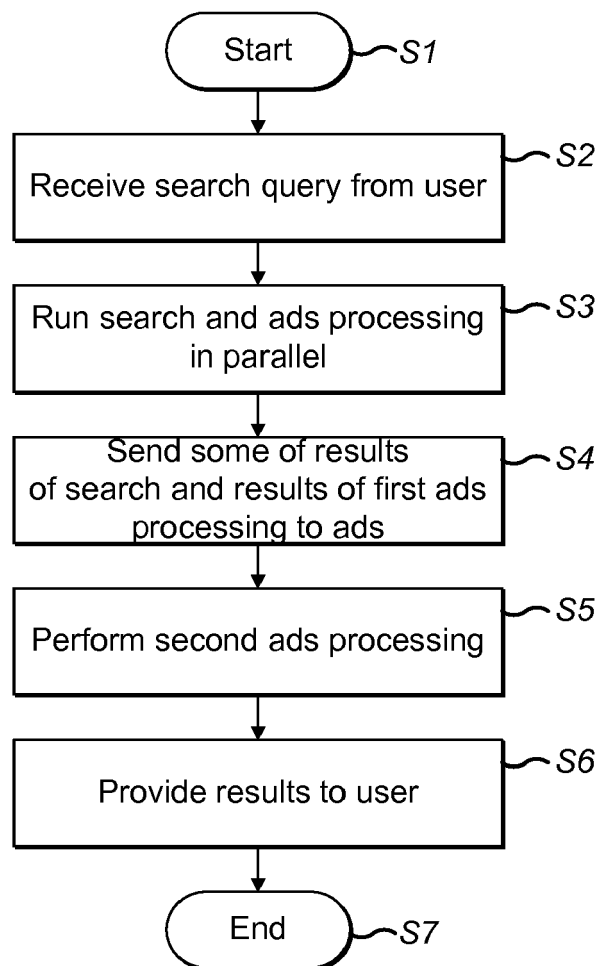
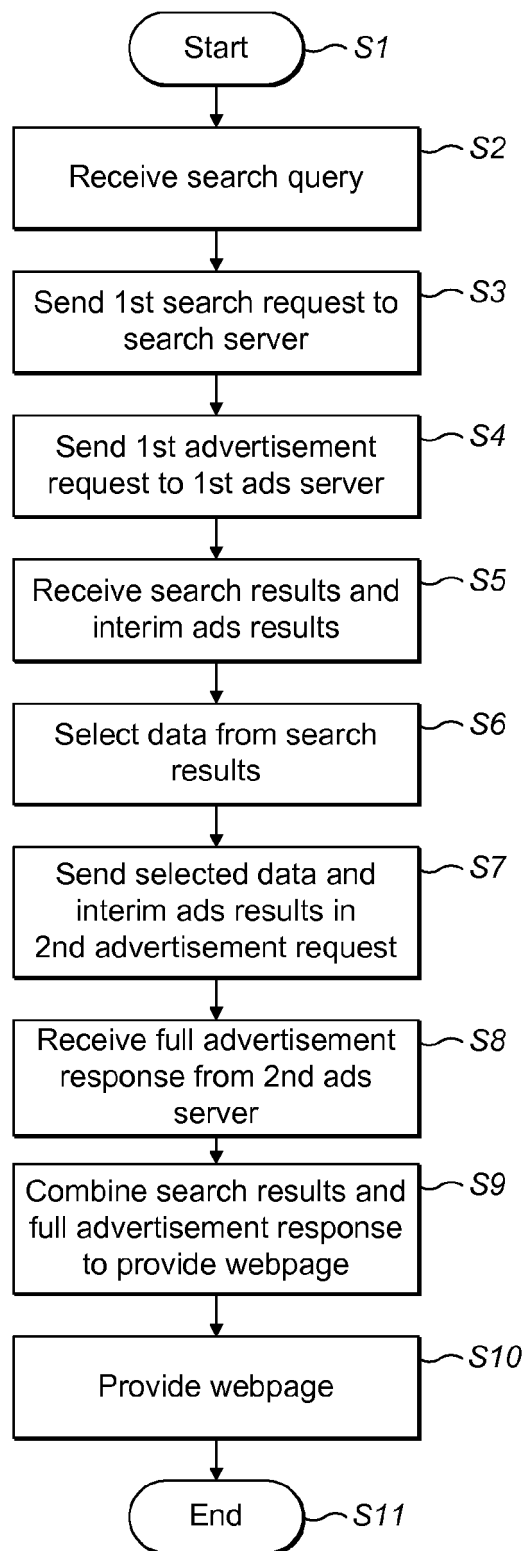
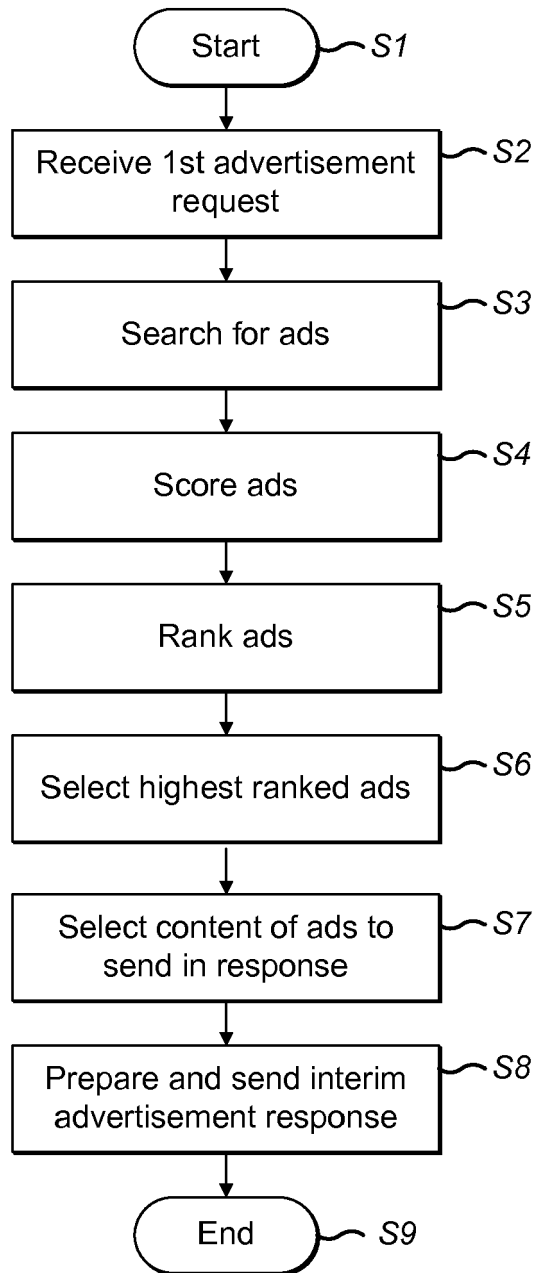


FIG. 1

**FIG. 2**

**FIG. 3**

*FIG. 4*

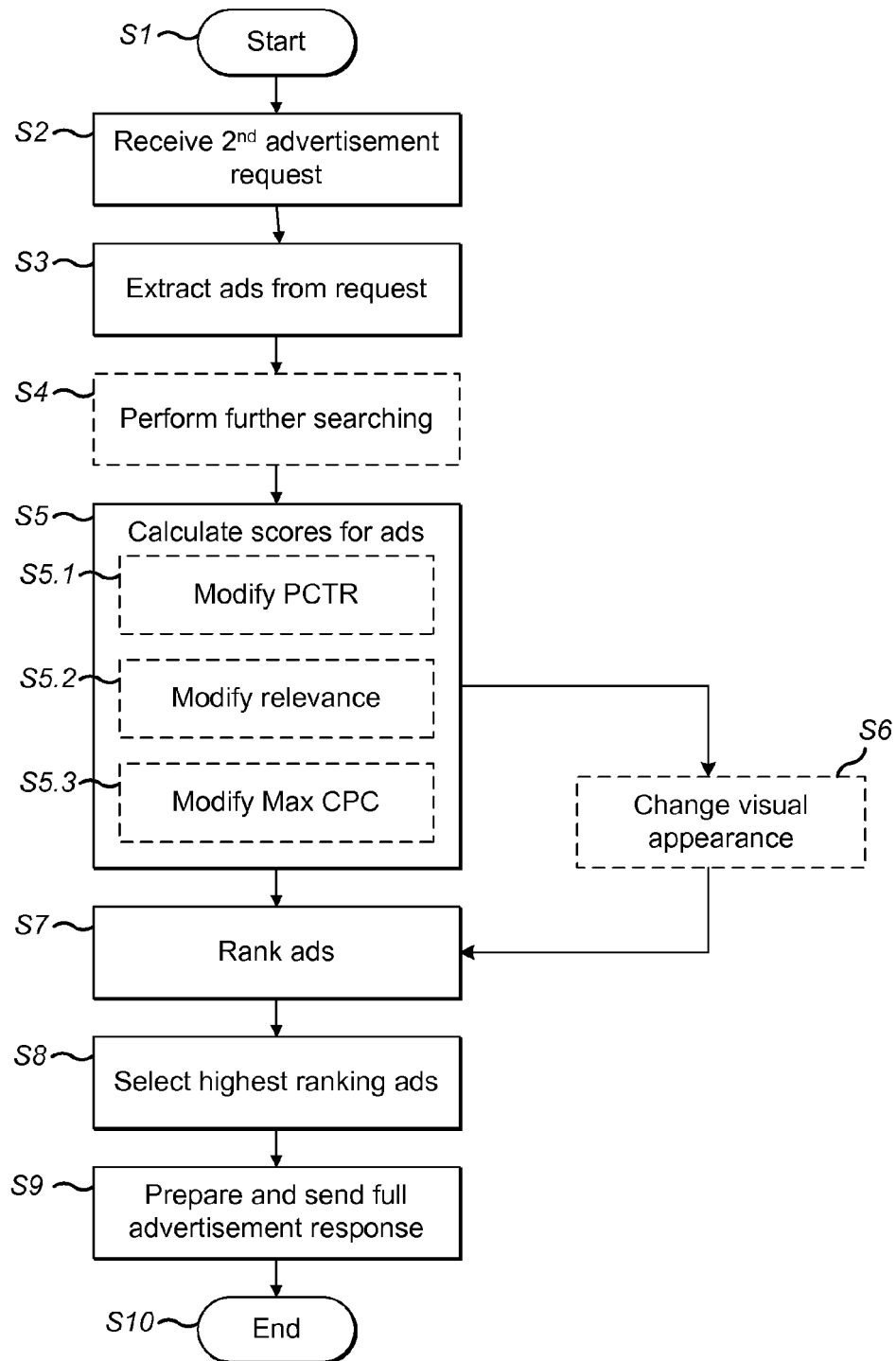


FIG. 5

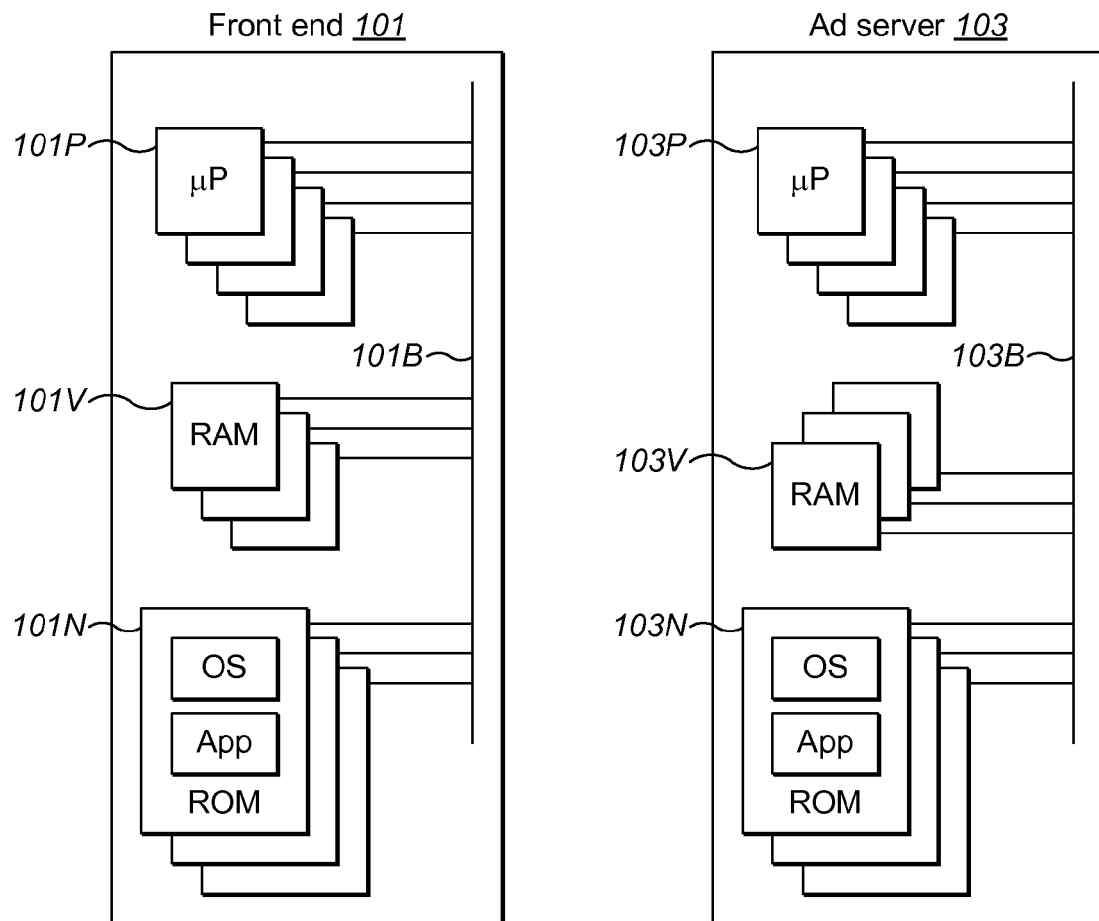


FIG. 6



EUROPEAN SEARCH REPORT

Application Number
EP 13 19 6433

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
	The claimed subject-matter, with due regard to the description and drawings in accordance with Art. 92 EPC, relates to processes comprised in the list of subject-matter and activities excluded from patentability under Art. 52(2) and (3) EPC. The information technology employed as an enabler for carrying out said processes is conventional. Its use for carrying out non-technical processes forms part of common general knowledge and it was widely available to everyone at the date of filing of the present application. No documentary evidence is therefore considered necessary. (See Official Journal EPO 11/2007, pages 592ff and 594ff) -----		INV. G06Q30/00
			TECHNICAL FIELDS SEARCHED (IPC) G06Q
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 3 February 2014	Examiner Anastasov, Yuliyen
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)