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(71) Applicant *(for all designated States except US)*: **CLARIA CORPORATION** [US/US]; 555 Broadway Street, Redwood City, CA 94063 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **GOULDEN, David L** [US/US]; 441 Grand Street, Redwood City, CA 94062 (US). **SHEVACH, Matthew A** [US/US]; 17 Wood Street, #102, Redwood City, CA 94118 (US). **BENNETT, Dominic** [US/US]; 48 Woods Lane, Los Altos, CA 94024 (US).

(74) Agents: **BENEDICTO, Patrick D.** et al.; OKAMOTO & BENEDICTO LLP, P.O.Box 641330, San Jose, CA 95164-1330 (US).

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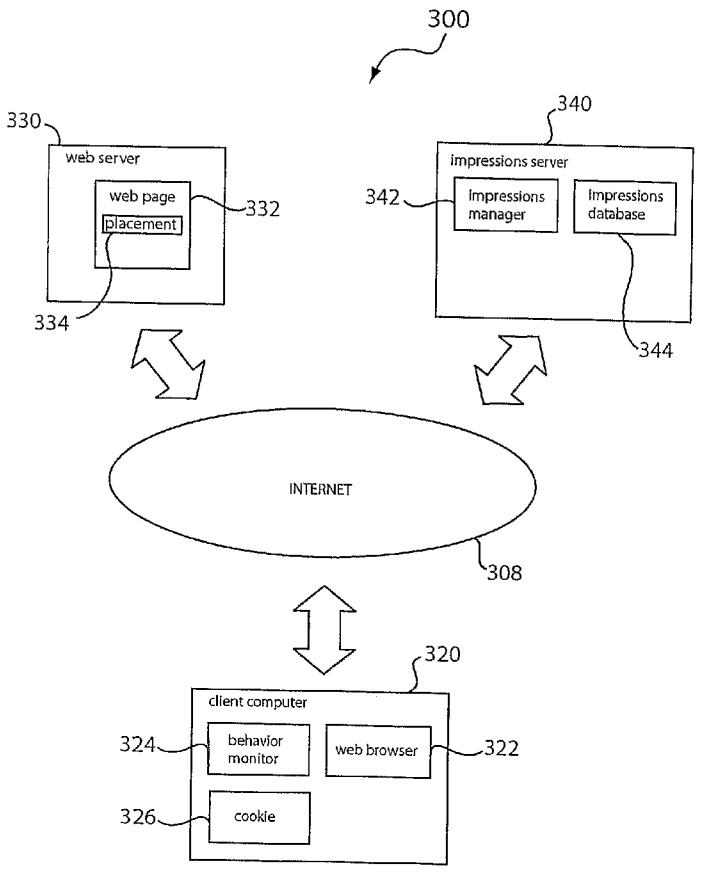

(57) Abstract: In one embodiment, an impression to be displayed in a placement (334) of a web page (332) is selected from candidate impressions (344) that may be displayed in the placement (334). The candidate impression may be chosen based on behavioral data and a placement identifier particularly identifying the placement (334). The behavioral data may include categories of websites visited by an end-user on the client computer. The candidate impressions may be in learning modes, and the impression displayed in the placement may be selected based on its learning mode and revenue generation capability.

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TECHNIQUES FOR DISPLAYING IMPRESSIONS IN DOCUMENTS DELIVERED OVER A COMPUTER NETWORK

Inventors: David L. Goulden, Matthew Shevach and Dominic Bennett

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application No. 60/694,533, filed on June 28, 2005.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to computer systems, and more particularly but not exclusively to displaying of impressions in documents delivered over a computer network.

2. Description of the Background Art

The Internet is an example of a computer network. On the Internet, end-users (i.e. consumers) on client computers may access various types of information resident in server computers. Information on the Internet is typically available in the form of documents referred to as "web pages." A server computer that provides web pages over the Internet is also referred to as a "web server" or a "website". A website comprises a plurality of web pages. A website may provide information about various topics or offer goods and services, for example. Just like in other medium, such as radio and television, advertisements allow websites to provide free access to web pages and other

services. That is, advertising revenues help pay for the development and maintenance of websites.

FIG. 1 shows a flow diagram schematically illustrating an example of how an advertisement is delivered to a client computer 120 on the Internet. A web page 132 has an advertising space 134 where an advertising server 140 may serve an advertisement 142. The web server 130 provides the web page 132 to the client computer 120 (arrow 151) upon request, such as by pointing a web browser to the uniform resource locator (URL) of the web page 132 on the Internet. When the web page 132 is received in the client computer 120, program code of the web page 132 requests the advertisement 142 from the advertising server 140 (arrow 152). In response, the advertising server 140 serves the advertisement 142 to the web page 132 (arrow 153), resulting in the advertisement 142 being displayed in the advertisement space 134. The advertisement 142 is normally designated to be displayed in the advertisement space 134 regardless of whether or not the advertisement 142 is the best advertisement for that space.

SUMMARY

In one embodiment, an impression to be displayed in a placement of a web page is selected from candidate impressions that may be displayed in the placement. The candidate impression may be chosen based on behavioral data and a placement identifier particularly identifying the placement. The behavioral data may include categories of websites visited by an end-user on the client

computer. The candidate impressions may be in learning modes, and the impression displayed in the placement may be selected based on its learning mode and revenue generation capability.

These and other features of the present invention will be readily apparent to persons of ordinary skill in the art upon reading the entirety of this disclosure, which includes the accompanying drawings and claims.

DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a flow diagram schematically illustrating an example of how an advertisement is delivered to a client computer on the Internet.

FIG. 2 shows a schematic diagram of an example computer that may be used in embodiments of the present invention.

FIG. 3 a schematically shows a computing environment in accordance with an embodiment of the present invention.

FIG. 4 shows a flow diagram of an example impression serving process in the computing environment of FIG. 3 in accordance with an embodiment of the present invention.

FIG. 5 schematically shows the components of an impressions manager in accordance with an embodiment of the present invention.

FIG. 6 shows a flow diagram of a method of selecting an impression among a plurality of candidate impressions that may be displayed in a placement

of a particular web page in accordance with an embodiment of the present invention.

FIG. 7 shows a flow diagram of a method of displaying an impression on a web page in accordance with an embodiment of the present invention.

The use of the same reference label in different drawings indicates the same or like components.

DETAILED DESCRIPTION

In the present disclosure, numerous specific details are provided, such as examples of apparatus, components, and methods, to provide a thorough understanding of embodiments of the invention. Persons of ordinary skill in the art will recognize, however, that the invention can be practiced without one or more of the specific details. In other instances, well-known details are not shown or described to avoid obscuring aspects of the invention.

Being computer-related, it can be appreciated that the components disclosed herein may be implemented in hardware, software, or a combination of hardware and software (e.g., firmware). Software components may be in the form of computer-readable program code stored in a computer-readable storage medium, such as memory, mass storage device, or removable storage device. For example, a computer-readable storage medium may comprise computer-readable program code for performing the function of a particular component. Likewise, computer memory may be configured to include one or more

components, which may then be executed by a processor. Components may be implemented separately in multiple modules or together in a single module.

Referring now to FIG. 2, there is shown a schematic diagram of an example computer that may be used in embodiments of the present invention. Depending on its configuration, the computer shown in the example of FIG. 2 may be employed as a client computer, a web server, an impressions server, or other data processing apparatus. The computer of FIG. 2 may have less or more components to meet the needs of a particular application. As shown in FIG. 2, the computer may include a processor 101, such as those from the Intel Corporation or Advanced Micro Devices, for example. The computer may have one or more buses 103 coupling its various components. The computer may include one ore more input devices 102 (e.g., keyboard, mouse), a computer-readable storage medium (CRSM) 105 (e.g., floppy disk, CD-ROM, flash memory), a CRSM reader 104 (e.g., floppy drive, CD-ROM drive, flash memory reader), a display monitor 109 (e.g., cathode ray tube, flat panel display), a communications interface 106 (e.g., network adapter, modem) for coupling to a network, one or more data storage devices 107 (e.g., hard disk drive, optical drive, non-volatile memory), and a main memory 108 (e.g., RAM). Software embodiments may be stored in the computer-readable storage medium 105 for reading into the data storage device 107 or the main memory 108. Software embodiments in the main memory 108 may be executed by the processor 101. In the example of FIG. 2, the main memory 108 is shown as comprising software modules 110, which may comprise one or more software components of a client computer 320 or impressions server 340 described later on below. The software

modules 110 may be loaded from the computer-readable storage medium 105, the data storage device 107, or over the Internet by way of the communications interface 106, for example. The software modules 110 and other programs in the main memory 108 may be executed by the processor 101.

FIG. 3 a schematically shows a computing environment 300 in accordance with an embodiment of the present invention. The computing environment 300 may include one or more client computers 320, one or more web servers 330, and one or more impressions servers 340. Only one of each is shown in FIG. 3 for clarity of illustration. In practice, one impressions server 340 may serve a plurality of client computers 320. A client computer 320, a web server 330, and an impressions server 340 may communicate over a public computer network 308, which in the example of FIG. 3 comprises the Internet.

A client computer 320 is typically, but not necessarily, a personal computer such as those running the Microsoft Windows™ operating system, for example. In the example of FIG. 3, the client computer 320 includes a web browser 322, a behavior monitor 324, and a cookie 326. The web browser 322 may be a commercially available web browser or web client. In one embodiment, the web browser 322 comprises the Microsoft Internet Explorer ™ web browser. The web browser 322 allows an end-user on the client computer 320 to access a web page over the Internet. A web page, such as a web page 332 of a web server 330, has a corresponding address referred to as a uniform resource locator ("URL"). The web browser 322 is pointed to the URL of a web page to receive that web page in the client computer 320. The web browser 322

may be pointed to a URL by entering the URL at an address window of the web browser 322, or by clicking a link pointed to that URL, for example.

The behavior monitor 324 is a client-side program in that it is stored and run in the client computer 320. The behavior monitor 324 may comprise computer-readable program code for monitoring the online activities of the end-user on the client computer 320. It is to be noted that the mechanics of monitoring an end-user's online activities, such as determining where an end-user is navigating to, the URLs of web pages received in the client computer 320, the domain names of websites visited by the end-user, what the end-user is typing on a web page, whether the end-user clicked on a link on a web page, when the end-user activates a mouse or keyboard, and the like, is, in general, known in the art and not further described here. For example, the behavior monitor 324 may learn of end-user online activities by receiving event notifications from the web browser 322. The behavior monitor may work in conjunction with another server (not shown). Techniques for monitoring end-user online activities using a client-side program are are also disclosed in commonly-owned U.S. Application No. 10/152,204, entitled "Method and Apparatus for Displaying Messages in Computer Systems," filed on May 21, 2002 by Scott G. Eagle, David L. Goulden, Anthony G. Martin, and Eugene A. Veteska, which is incorporated herein by reference in its entirety.

In one embodiment, websites and web pages are grouped according to categories. Each category may include a listing of websites and/or web pages (e.g. by URL) relevant to that category. For example, websites and web pages relating to vacations, such as those from tourism bureaus, hotel chains, rental

cars, and other vacation-related websites, may be included in the "vacations" category, websites and web pages relating to cars may be included in the "cars" category, and so on. A website or web page may belong to more than one category. For example, a website pertaining to wood working may belong to both the "power tool" category and the "hobby category." A human researcher may categorize popular websites and web pages by categories and store the categories and associated websites and web pages (as identified by URL, for example) in a category table or database accessible to the behavior monitor 324. The behavior monitor 324 may listen for the URLs of websites visited by the end-user, determine the categories of the websites (e.g. by consulting the category table), and store or facilitate storage of the categories in the cookie 326.

In one embodiment, the behavior monitor 324 further includes computer-readable program code for recording the impressions already delivered to the client computer 320 and whether or not the end-user interacted (e.g. by mouse clicking) with any of the impressions. Each impression that has already been displayed in the client computer 320 may be identified by its impression ID and stored in the cookie 326. As will be more apparent below, this allows the impressions server 340 to minimize repeated displaying of the same impressions or similar impressions that the end-user is likely not interested in.

The cookie 326 may also contain a client computer ID that anonymously and uniquely identifies the client computer 320. The cookie 326 is shown as a single cookie in the example of FIG. 3 for clarity of illustration. The contents of the cookie 326 may also be separated out in multiple cookies without detracting from the merits of the present invention. The use of cookies to carry various

types of data is also disclosed in the commonly-assigned U.S. Application No. (not yet known), entitled "Method and Device for Publishing Cross-Network User Behavioral Data," filed on September 14, 2005, by Anthony Martin, David L. Goulden, Dominic V. Bennett, Roger Petersen, and Remigiusz Paczkowski, Express Mail No. EV 314047068 US, which is incorporated herein by reference in its entirety.

A web server 330 may comprise hardware and software components for providing web pages to client computers 320. In the example of FIG. 2, the web server 330 provides a web page 332 over the Internet. The web page 332 may contain information that is of interest to end-users surfing on the Internet. The web page 332 may include a placement 334 in which an impression may be displayed. The placement 334 may have an associated identifier, referred to as "placement ID," for identifying the particular web page 332 where the placement 334 is located. As will be more apparent below, the placement ID allows the impressions server 340 to identify the particular web page requesting the impressions. This enables the impressions server 340 to select what it deems as the best impression for that web page. The placement ID may be in the form of a hypertext markup language (HTML) tag embedded in the web page 332, for example.

As used in the present disclosure, an "impression" refers to a message configured to be displayed a certain way on the web page 332. In the example of FIG. 3, the placement 334 includes computer-readable program code for requesting an impression from the impressions server 340 and displaying the impression in the web page 332 in the client computer 320. For example, the

placement 334 may include HTML code for pulling an impression from the impressions server 340.

An impressions server 340 may comprise hardware and software components for serving impressions to client computers 320. The impressions server 340 may comprise an impressions manager 342 and an impressions database 344. The components and functionalities of the impressions server 340 may be in one or more server computers.

An impression may comprise a message and a creative. A creative is a design of how the message is to be presented to end-users. As can be appreciated, a single message may be displayed using different creatives. For example, an announcement of the release of a new movie (message) may be displayed as a conventional banner (first creative), a banner with accompanying music (second creative), a banner displaying the movie's trailer (third creative), or a banner with varying texts depending on the particular placement (fourth creative), for example. A single message may thus be in a plurality of impressions, each of which has a different creative for the message.

Impressions available for serving from the impressions server 340 may be stored in the impressions database 344. Impressions database 344 may comprise a commercially-available database program, such as those available from the Oracle Corporation of Redwood Shores, California. The impressions in the impressions database 344 may be assigned to be displayed only in specific web pages identified by placement ID. For example, an impression for a vacations advertisement may be contracted to be displayed to a web page in a first website, all web pages in a second website, and so on. In that case, the

impression as stored in the impression database 344 may have a corresponding entry indicating the placement ID's of placements 334 where the impression may be displayed.

The impressions manager 342 may comprise computer-readable program code for selecting an impression among a plurality of available impressions and serving that impression to a requesting client computer 320. In one embodiment, the impressions manager 342 selects from a plurality of impressions available from the impressions database 344. The impressions manager 342 may select what it deems as the optimum impression for a particular placement. The optimum impression for a particular placement may be the one that generates or is likely to generate the most revenue when displayed in that particular placement. As can be appreciated, advertisers may pay advertising fees based on a number of impressions that have been served to client computers. For example, an advertiser may pay the operator of the impressions server 340 a particular amount for every thousand impressions served by the impressions server 340 to client computers 320. In selecting the optimum impression for a particular placement, the impressions server 340 may analyze data indicative of the number of times impressions have been served to client computers on the Internet and how much revenue the impressions generate.

FIG. 4 shows a flow diagram of an example impression serving process in the computing environment 300 in accordance with an embodiment of the present invention. In the example of FIG. 4, the behavior monitor 324 monitors the websites visited by the end-user on the client computer 320 and stores or facilitates storage of the categories of those websites in the cookie 326. For

example, if the end-user has previously viewed web pages relating to power tools and car rentals, the cookie 326 would contain encrypted or unencrypted data in the cookie 326 indicating the categories "power tools" and "car rentals." When the web browser 322 is pointed to receive the web page 332, the web server 330 provides the web page 332 to the client computer 320 for display in the web browser 322 (arrow 451). Upon receipt in the client computer 320, computer-readable program code in the web page 332 associated with the placement 334 sends a request for impression and the cookie 326 to the impressions manager 342 of the impressions server 340 (arrow 452). The request for impression may include the placement ID of the placement 334. The impressions manager 342 receives the request and, based on data in the cookie 326 and the placement 334 (as identified by its placement ID), selects an impression to be displayed in the placement 334. The impressions manager 342 may select the impression from among the plurality of impression in the impressions database 344 then serve the selected impression to the client computer 320 (arrow 453). In the client computer 320, the selected impression is displayed in the placement 334 of the web page 332.

FIG. 5 schematically shows the components of an impressions manager 342 in accordance with an embodiment of the present invention. In the example of FIG. 5, the impressions manager 342 comprises a personalization module 504, a business rule enforcer 506, and an optimizer 508. In one embodiment, the impressions manager 342 receives behavioral data 501 and a placement ID 502 as inputs and determines a selected impression 510 as an output. The behavioral data 501 may comprise information indicative of an end-user's

preference based on monitoring of the end-user's online behavior. In one embodiment, the behavioral data 501 indicate the categories of websites previously visited by the end-user. The behavioral data 501 may also indicate the impressions already displayed in the client computer 320 and whether or not the end-user interacted with the impressions. The behavioral data 501 may contain the client computer ID of the client computer 320 for identification purposes. The behavioral data 501 may be stored in a cookie 326, which the impressions server 340 receives from the end-user's client computer 320.

Generally speaking, a placement is a location in a web page of a website in which an impression is to be displayed. The placement ID 502 identifies a particular placement 334. The placement ID 502 thus allows the impressions manager 342 to identify the website serving the web page that contains the placement. Identifying the website not only facilitates accounting how many times an impression has been served to a web page of the website for billing purposes, but also advantageously helps in determining the best performing impression to serve to the web page based on revenue.

The personalization module 504 may comprise computer-readable program code for determining a list of impressions suitable for display in a particular placement. In the example of FIG. 5, the personalization module 504 receives the behavioral data 501 and the placement ID as input. In one embodiment, the personalization module goes through available impressions in the impressions database 344 and generates a list of impressions related to the same categories of websites indicated in the behavioral data 501 and may be displayed in the particular placement identified by the placement ID 502. The

personalization module 504 advantageously allows for selection of impressions most likely to be of interest to the end-user as it finds impressions in the same categories as the websites previously visited by the end-user.

The business rule enforcer 506 may comprise computer-readable program code for determining which of the suitable impressions found by the personalization module 504 complies with business rules designed to further increase the likelihood that the end-user will be interested in the impressions. In one embodiment, the business rule enforcer reads the impression ID's and the client computer ID in the behavioral data 501 to find impressions that have already been displayed in the client computer 320. The business rule enforcer 506 may filter out (i.e. remove) those impressions from the list of suitable impressions. The business rule enforcer 506 may also filter out impressions belonging to a category that the end-user has not expressed interest in (e.g. did not interact with impressions in that category). The business rule enforcer may also enforce additional or other rules to the list of suitable impressions without detracting from the merits of the present invention.

The optimizer 508 may comprise computer-readable program code for selecting an optimum impression among a plurality of suitable impressions. In one embodiment, the optimizer 508 selects the optimum impression from the filtered set of suitable impressions generated by the business rule enforcer 506. The optimizer 508 may also select the optimum impression from the list of suitable impressions found by the personalization module 504 in cases where the business rule enforcer 506 is not employed. In one embodiment, the optimizer 508 selects the optimum impression based on revenue generation.

That is, the optimizer 508 may select as optimum an impression that results in the most revenue when displayed in the client computer 320. Of course, the teachings of the present disclosure may also be adapted to use factors other than revenue without detracting from the merits of the present invention. The optimum impression selected by the optimizer 508 is shown in FIG. 5 as selected impression 510.

In one embodiment, the optimizer 508 groups impressions according to learning modes. A learning mode is indicative of the amount of data available for a given impression. In one embodiment, a learning mode is a measure of the number of times a given impression has been served to web pages across the Internet.

In one embodiment, an impression that has been served less than or equal to a first predetermined threshold number of times ***X*** in a particular placement or any placement is in "non-scaled" mode. Non-scaled is a pure learning mode as it means the impression has not been served enough times to provide reliable data about its performance.

In one embodiment, an impression that has been served greater than or equal to a second predetermined threshold number of times ***Y*** in any placement, where $Y > X$, is in "globally scaled" mode. An impression that is in globally scaled mode has enough data to allow for reasonably reliable determination of how the impression performs on a global basis (not in any particular placement).

In one embodiment, an impression that has been served greater than or equal to a third predetermined threshold number of times ***Z*** in a particular

placement, where $Z > Y$, is in "fully scaled" mode. An impression that is in fully scaled mode has enough data to allow for reasonably reliable determination of how the impression performs on a particular placement (as opposed to placements in general). That is, an impression in fully scaled mode has been displayed enough times in a particular placement to provide reasonably reliable information about its performance in that placement. An impression that satisfies both the requirements for globally scaled and fully scaled modes may be deemed to be in fully scaled mode. The values of ***X***, ***Y***, and ***Z*** may vary depending on the application. The optimizer 508 may keep track of the number of times a particular impression has been served and to which web page to allow the optimizer 508 to determine the learning mode of the impression.

For each particular impression, the optimizer 508 may keep track of the revenue generated by displaying the impression in a particular placement (as identified by placement ID) and the learning mode of the impression. An example look up table accessible to the optimizer 508 for keeping track of impression data is shown in Table 1.

TABLE 1

Impression ID (Message/Creative)	Placement ID	Revenue per thousand (RPM)	Learning Mode
2001	10001	$1.75	Non-scaled
2002	10001	$2.50	Fully Scaled
2003	10001	$1.99	Globally Scaled
....	....	....	....
....	....	....	....
2051	10002	$4.60	Non-scaled
2052	10002	$1.25	Non-scaled
2053	10002	$3.34	Globally scaled
....	....	....	....
....	....	....	....
2094	10003	$2.30	Fully Scaled
2095	10003	$2.50	Fully Scaled
2096	10003	$1.25	Fully Scaled

....	....	....	....
....	....	....	....

In the example of Table 1, an impression ID identifies a particular message-creative combination forming an impression. The RPM column indicates the amount of revenue generated by displaying the impression in a particular placement in a web page. For example, the impression associated with impression ID 2001 generates $1.75 every thousand times it is displayed in the placement having the placement ID 10001. The learning mode column indicates the learning mode of the impression. In the example of Table 1, an impression having the impression ID of 2001, 2002, or 2003 may be displayed in a placement having a placement ID of 10001, an impression having the impression ID of 2051, 2052, or 2053 may be displayed in a placement having a placement ID of 10002, and so on. The optimizer 508 may employ data similar to that in Table 1 in selecting an optimum impression.

FIG. 6 shows a flow diagram of a method 600 of selecting an impression among a plurality of candidate impressions that may be displayed in a placement of a web page. The candidate impressions may be those in the list of suitable impressions found by the personalization module 504 or from the filtered set of suitable impressions found by the business rule enforcer 506, for example. The method 600 may also be performed by other components without detracting from the merits of the present invention.

In block 602, the optimizer 508 detects the learning modes of the candidate impressions. The optimizer 508 may consult a table (e.g. Table 1) or

a database to determine the learning mode of each of the candidate impressions.

Block 603 follows from block 602 when all of the candidate impressions are in non-scaled mode. In that case, in block 604, the optimum impression is randomly selected from the candidate impressions.

Block 605 follows from block 602 when all of the candidate impressions are in globally scaled mode. In that case, in block 606, the optimum impression is the globally scaled impression that generates the highest revenue among the candidate impressions.

Block 607 follows from block 602 when all of the candidate impressions are in fully scaled mode. In that case, in block 608, the optimum impression is the fully scaled impression that generates the highest revenue among the candidate impressions.

Blocks 609, 610, 611, and 612 follow from block 602 when the candidate impressions have different learning modes. In block 609, the candidate impressions consist only of impressions that are in non-scaled mode, impressions that are in globally scaled mode, and impressions that are in fully scaled mode. In block 610, the candidate impressions consist only of impressions that are in non-scaled mode and impressions that are in globally scaled mode. In block 611, the candidate impressions consist only of impressions that are in non-scaled mode and impressions that are in fully scaled mode. In block 612, the candidate impressions consist only of impressions that are in globally scaled mode and impressions that are in fully scaled mode.

In the case of blocks 609, 610, 611, and 612, the optimizer 508 generates a random number and applies learning mode percentages to determine which of the learning modes will be retained for further selection. Candidate impressions that are not in the learning mode that has been retained will be removed from further consideration. For example, if fully scaled mode has been retained for further selection, the optimum impression will be selected from candidate impressions that are in fully scaled mode. In that example, impressions that are in non-scaled or globally scaled mode will not be included in the selection of the optimum impression.

The learning percentages may be based on the number of candidate impressions in each of the learning modes. That is, the retained learning mode may be randomly chosen from among the learning modes with the probability scaled or adjusted according to the number of impressions in each of the learning modes. For example, if 60% of the candidate impressions are in non-scaled mode and 40% of the candidate impressions are in globally scaled mode, 100 integer numbers ("tickets") may be allocated with 60 of the numbers being assigned to non-scaled and 40 of the numbers being assigned to globally scaled. A random number is then generated to pick from the 100 integer numbers to determine which one of the learning modes (non-scaled or globally scaled in this example) will be retained. If non-scaled is selected, candidate impressions that are in non-scaled mode will be retained for further selection and the other candidate impressions (globally scaled in this example) are removed from consideration. If globally scaled is selected, candidate impressions that are in globally scaled mode will be retained for further selection and the other

candidate impressions (non-scaled in this example) are removed from consideration. The procedure is similar for other combinations of learning modes.

Block 614 follows from block 613 when non-scaled mode is retained for further selection. In that case, in block 615, the optimum impression is randomly selected from among non-scaled impressions in the candidate impressions.

Block 616 follows from block 613 when globally scaled mode has been retained for further selection. In that case, in block 617, the optimum impression is the highest revenue generating globally scaled impression in the candidate impressions.

Block 618 follows from block 613 when fully scaled mode has been retained for further selection. In that case, in block 619, the optimum impression is the highest revenue generating fully scaled impression in the candidate impressions.

The optimum impression selected in blocks 615, 617, or 619 may be the selected impression 510 shown in the example of FIG. 5.

FIG. 7 shows a flow diagram of a method 700 of displaying an impression in a web page in accordance with an embodiment of the present invention. Method 700 may be, but not necessarily, performed in the computing environment 300 (FIG. 3). Method 700 may also be performed in other computing environments without detracting from the merits of the present invention.

In step 702, an impressions server receives a request for an impression to be displayed in a placement of a web page. The request for the impression may be provided by the client computer to the impressions server as a result of receiving the web page in the client computer.

In step 704, the impressions server receives from the client computer a placement identifier particularly identifying the placement. The placement identifier may comprise an HTML tag embedded in the web page, for example.

In step 706, the impressions server receives behavioral data from the client computer. The behavioral data may be stored in a cookie forwarded from the client computer to the impressions server. The behavioral data may be indicative of websites previously visited by an end user on the client computer and impressions previously received in the client computer. For example, the behavioral data may include categories of websites previously visited by the end user and a listing of impressions (e.g. advertisements) previously served to web pages in the client computer.

In step 708, the impressions server determines a set of candidate impressions that may be displayed in the placement. The candidate impressions may be determined based on the behavioral data and the placement identifier. For example, the candidate impressions may comprise impressions specifically designated to be displayed in a placement having the same placement identifier as that received from the client computer. As another example, the candidate impressions may comprise impressions that are related to a category of websites that is noted in the behavioral data.

In step 710, the impressions server determines the learning mode of each of the candidate impressions. A learning mode may be indicative of a number of times an impression has been served to web pages in client computers on the Internet.

In step 712, the impressions server selects a selected impression from the candidate impressions. The selected impression may be selected based on the learning mode and revenue generation capability of each of the candidate impressions.

In step 714, the selected impression is displayed in the placement of the web page.

Improved techniques for displaying impressions in documents delivered over a computer network have been disclosed. While specific embodiments of the present invention have been provided, it is to be understood that these embodiments are for illustration purposes and not limiting. Many additional embodiments will be apparent to persons of ordinary skill in the art reading this disclosure.

CLAIMS

What is claimed is:

1. A method of displaying an impression in a web page, the method comprising:

receiving a request for an impression to be displayed in a placement of a web page, the request being provided by a client computer as a result of receiving the web page;

receiving a placement identifier particularly identifying placement, the placement identifier being embedded in the web page;

receiving behavioral data from the client computer, the behavioral data being indicative of websites previously visited by an end-user on the client computer and indicative of impressions previously received in the client computer;

determining a plurality of candidate impressions that may be displayed in the placement based on the behavioral data;

determining a learning mode of each impression in the plurality of candidate impressions, the learning mode being indicative of a number of times each impression in the plurality of candidate impressions has been served to client computers on the Internet;

selecting a selected impression from the plurality of candidate impressions based on the learning mode of each of the impressions; and

displaying the selected impression in the web page.

2. The method of claim 1 wherein determining the plurality of candidate impressions that may be displayed in the placement based on the behavioral data comprises:

using the behavioral data and the placement identifier to determine a first set of impressions that may be displayed in the web page;

generating a second set of impressions from the first set of impressions by applying business rules to the first set of impressions, the business rules being designed to increase a likelihood that the end-user will be interested in impressions in the second set of impressions.

3. The method of claim 2 wherein the business rules include a rule that impressions previously displayed in the client computer are not included in the second set of impressions.

4. The method of claim 1 wherein the placement identifier comprises a hypertext markup language (HTML) tag.

5. The method of claim 1 wherein selecting the selected impression from the plurality of candidate impressions comprises:

if all impressions in the plurality of candidate impressions are in a non-scaled learning mode, then randomly selecting the selected impression from the plurality of candidate impressions;

If all impressions in the plurality of candidate impressions are in a globally scaled learning mode, then selecting a highest revenue generating impression in the plurality of candidate impressions as the selected impression;

if all of the impressions in the plurality of candidate impressions are in a fully scaled mode learning mode, then selecting a highest revenue generating impression in the plurality of candidate impressions as the selected impression;

if impressions in the plurality of candidate impressions are in different learning modes, then selecting impressions in the plurality of candidate impressions that are either in the non-scaled learning mode, the globally scaled learning mode, or the fully scaled learning mode to be in a final set of candidate impressions, and selecting the selected impression from the final set of candidate impressions.

wherein impressions in the non-scaled mode comprise impressions that have been served less than a predetermined threshold number of times ***X***, wherein impressions in the globally scaled mode comprise impressions that have been served a second predetermined threshold number of times ***Y*** in any web page, where ***Y>X***, and wherein impressions in the fully scaled mode comprise impressions that have been served a third predetermined threshold number of times ***Z*** in a particular web page, where ***Z>Y***.

6. The method of claim 1 wherein each impression in the plurality of candidate impressions comprises a message and an associated creative, the creative being a design of how the message is to be presented to the end-user.

7. The method of claim 6 wherein the plurality of candidate impressions comprise:

a first message with an associated first creative;

the first message with an associated second creative; and

the first message with an associated third creative;

wherein the first, second, and third creatives are different from each other.

8. A system for serving an impression to a web page, the system comprising:

an impressions server computer configured to select a selected impression from a set of impressions that may be displayed in a placement of a web page in a client computer, the impressions server computer being configured to select the selected impression using behavioral data received from the client computer and a placement identifier embedded in the web page and particularly identifying the placement, the behavioral data containing information indicative of websites previously visited by an end-user of the client computer and impressions previously displayed in the client computer.

9. The system of claim 8 wherein the behavioral data are stored in a cookie received by the impressions server computer from the client computer.

10. The system of claim 9 wherein the client computer comprises:

a behavior monitor comprising computer-readable program code for monitoring online-activities of the end-user, the behavior monitor being configured to facilitate storage in the cookie categories of websites visited by the end-user.

11. A method of displaying an impression in a web page, the method comprising:

receiving a request for an impression to be displayed in a placement of a web page in a client computer;

receiving a cookie from the client computer, the cookie containing behavioral data indicative of categories of websites previously visited by an end-user on the client computer; and

using the behavioral data to select a selected impression from a plurality of candidate impressions that may be displayed in the placement of the web page, the selected impression being a highest revenue generating impression among impressions in the plurality of candidate impressions.

12. The method of claim 11 further comprising:

receiving a placement identifier particularly identifying the placement.

13. The method of claim 11 wherein the plurality of candidate impressions comprise:

a first message with an associated first creative;

the first message with an associated second creative; and

the first message with an associated third creative;

wherein the first, second, and third creatives being different from each other.

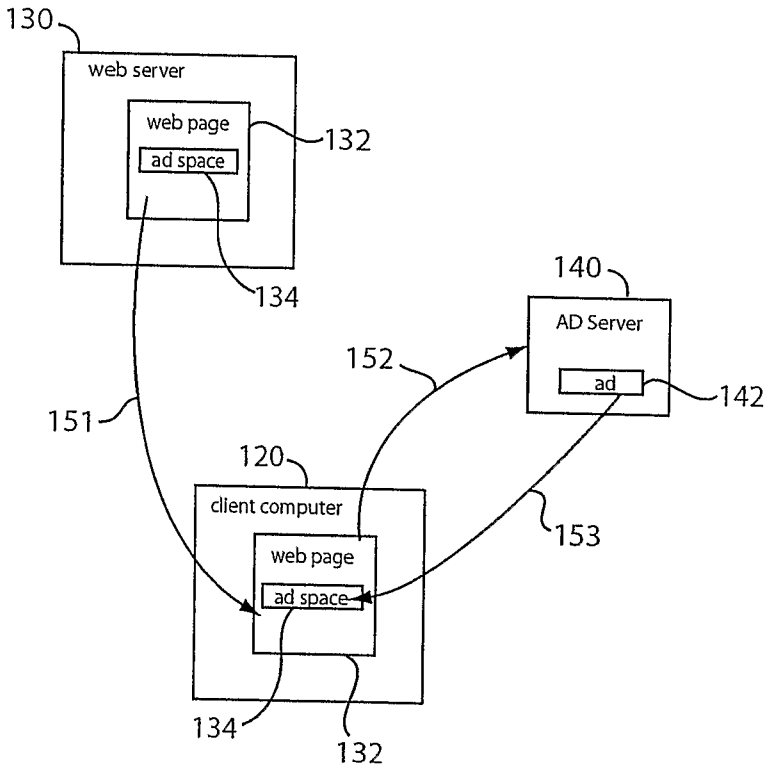

FIG. 1
(PRIOR ART)

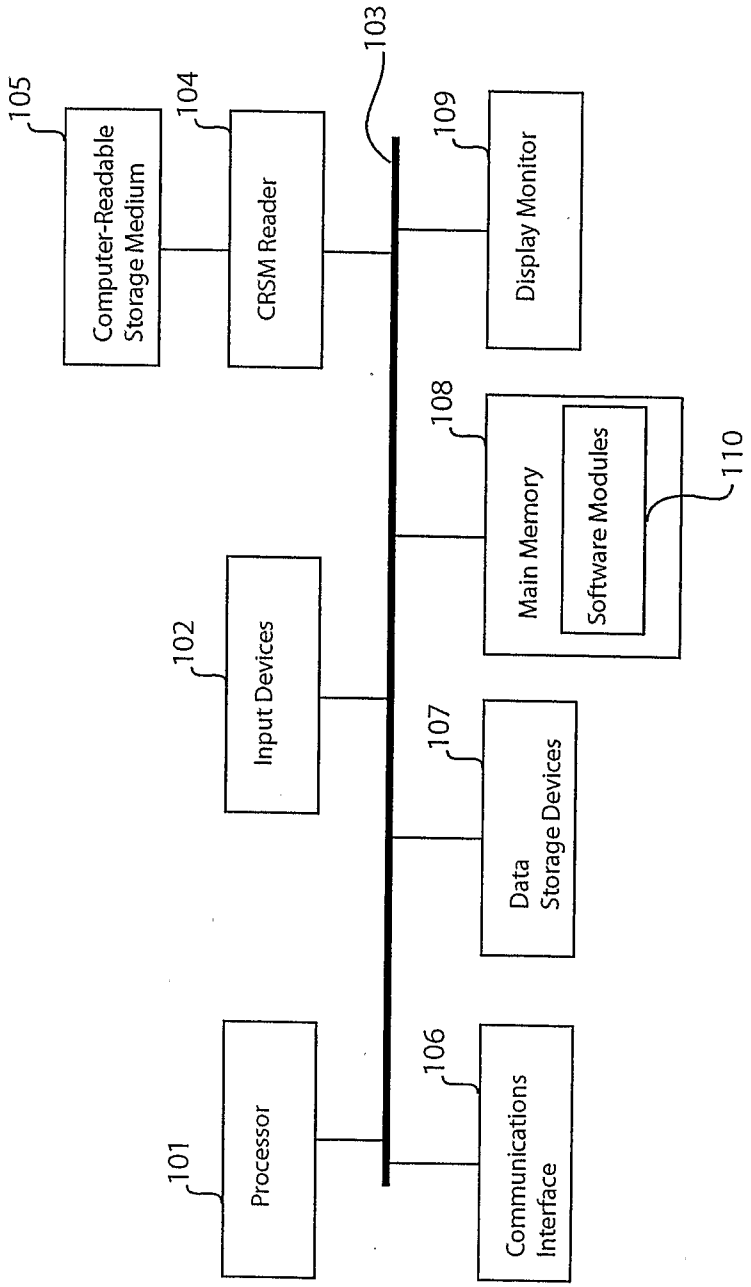
105
Computer-Readable Storage Medium
104
CRSM Reader
103
109
Display Monitor
108
Main Memory
Software Modules
110
102
Input Devices
107
Data Storage Devices
101
Processor
106
Communications Interface

FIG. 2

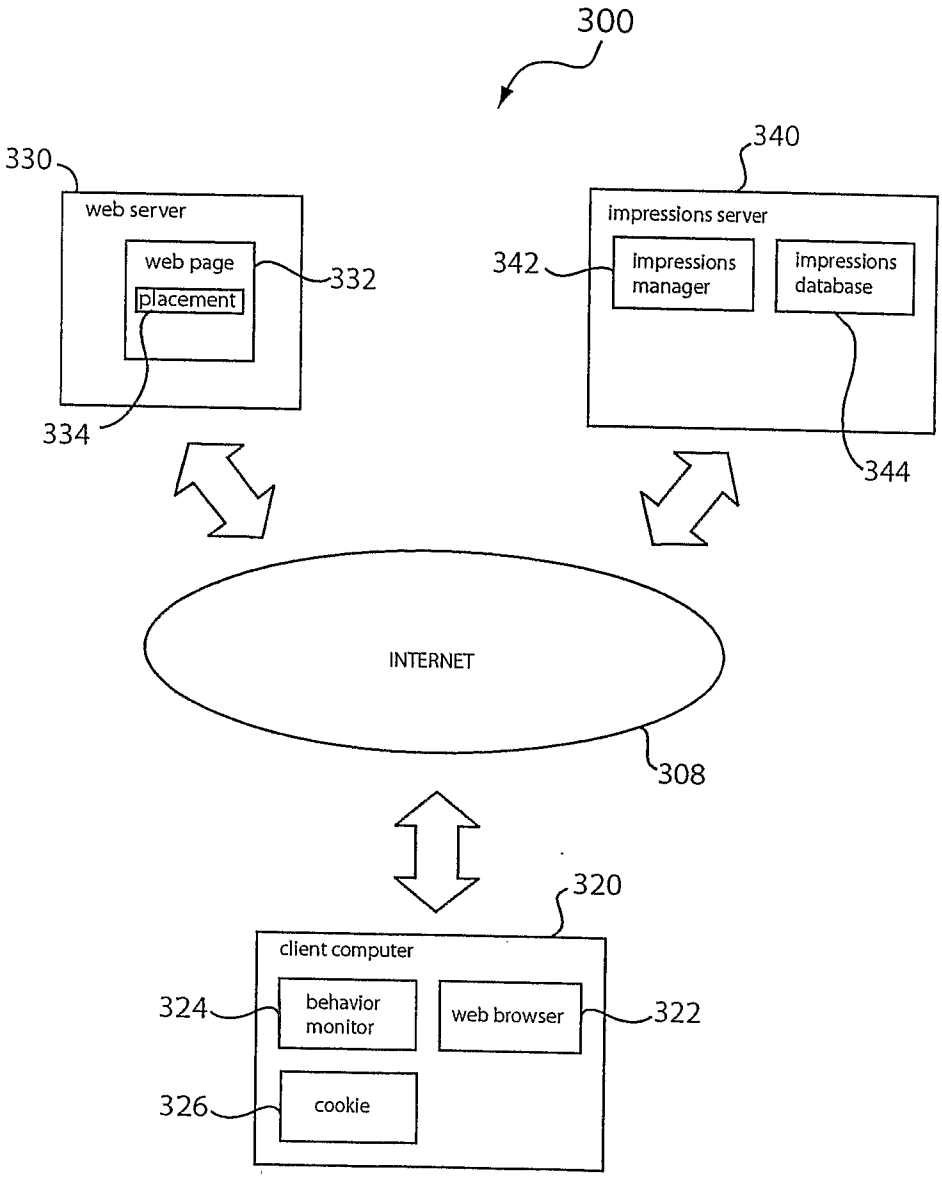
300
330
web server
web page
placement
332
334
340
impressions server
342
impressions manager
impressions database
344
INTERNET
308
320
client computer
324
behavior monitor
web browser
322
326
cookie

FIG. 3

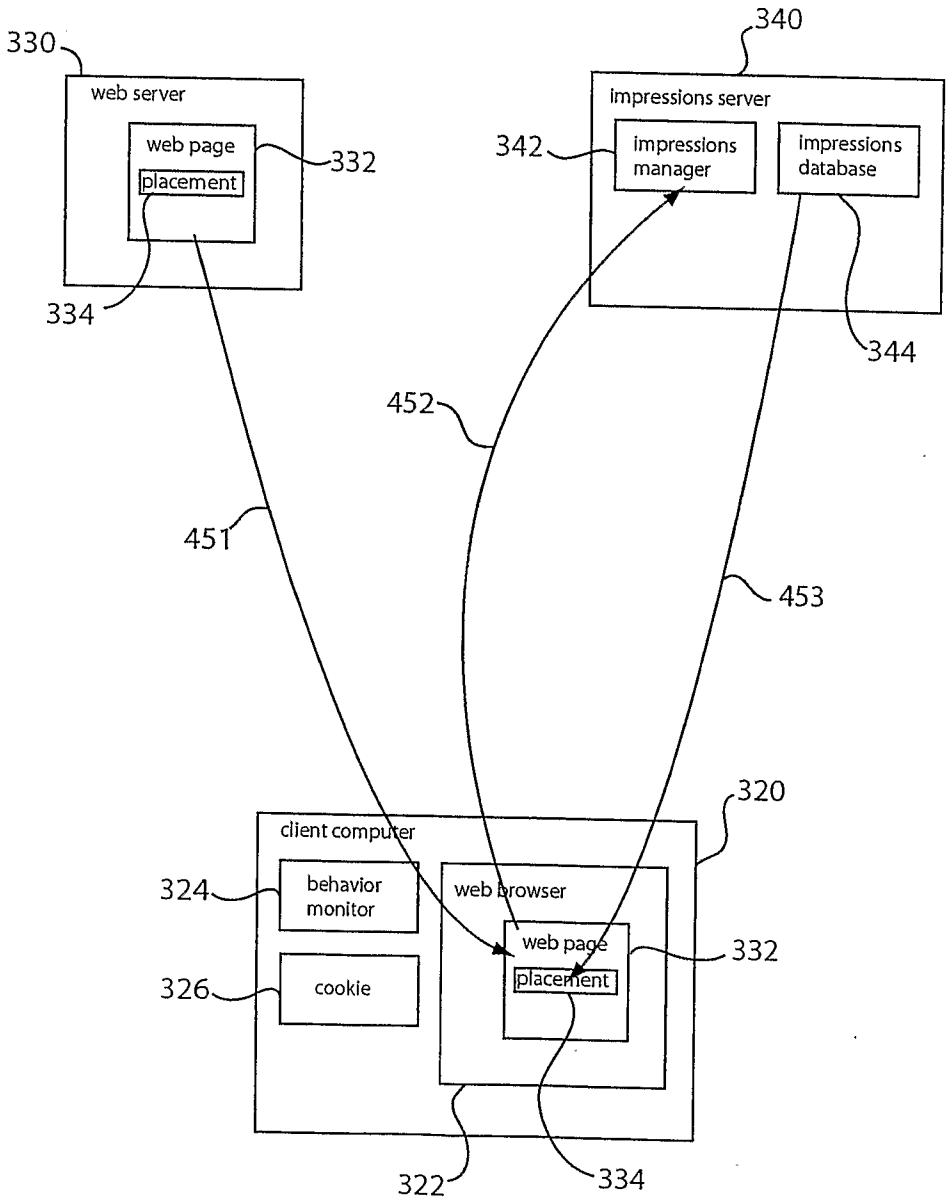
330
web server
web page
placement
332
334
340
impressions server
342
impressions manager
impressions database
344
452
451
453
320
client computer
324
behavior monitor
web browser
web page
placement
332
326
cookie
322
334

FIG. 4

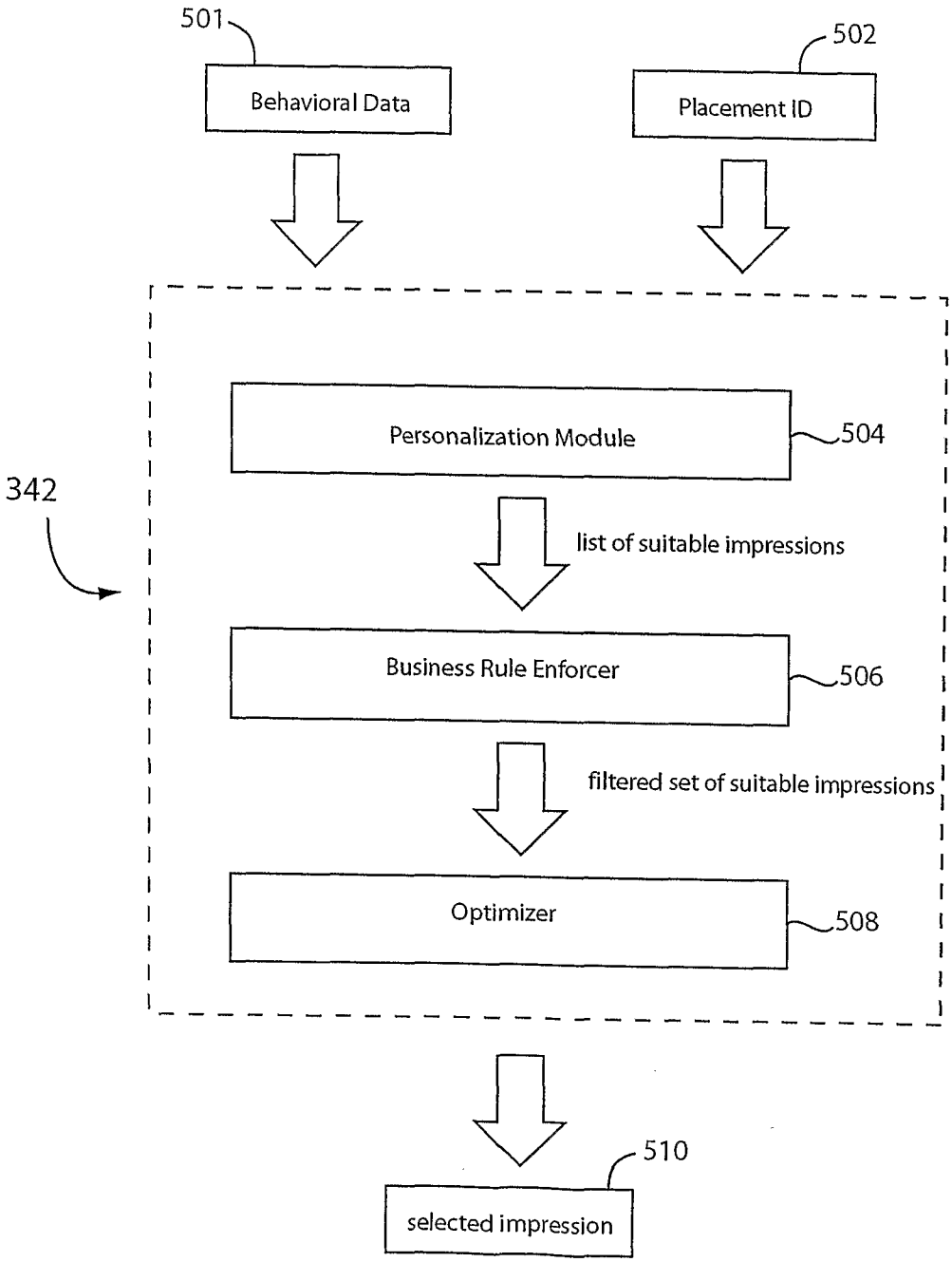
501
Behavioral Data
502
Placement ID
342
Personalization Module
504
list of suitable impressions
Business Rule Enforcer
506
filtered set of suitable impressions
Optimizer
508
510
selected impression

FIG. 5

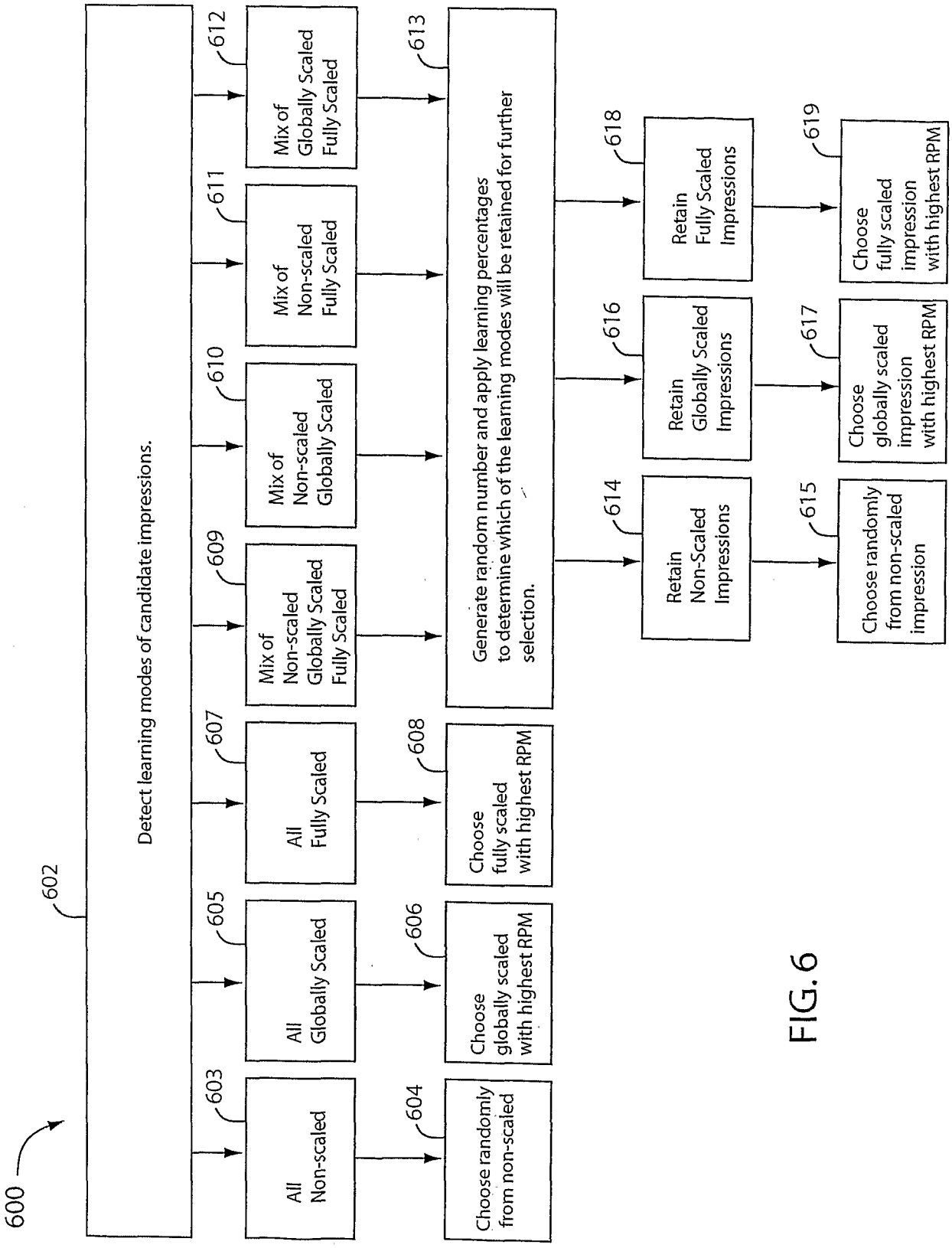
600
602
Detect learning modes of candidate impressions.
603
All Non-scaled
604
Choose randomly from non-scaled
605
All Globally Scaled
606
Choose globally scaled with highest RPM
607
All Fully Scaled
608
Choose fully scaled with highest RPM
609
Mix of Non-scaled Globally Scaled Fully Scaled
610
Mix of Non-scaled Globally Scaled
611
Mix of Non-scaled Fully Scaled
612
Mix of Globally Scaled Fully Scaled
613
Generate random number and apply learning percentages to determine which of the learning modes will be retained for further selection.
614
Retain Non-Scaled Impressions
615
Choose randomly from non-scaled impression
616
Retain Globally Scaled Impressions
617
Choose globally scaled impression with highest RPM
618
Retain Fully Scaled Impressions
619
Choose fully scaled impression with highest RPM

FIG. 6

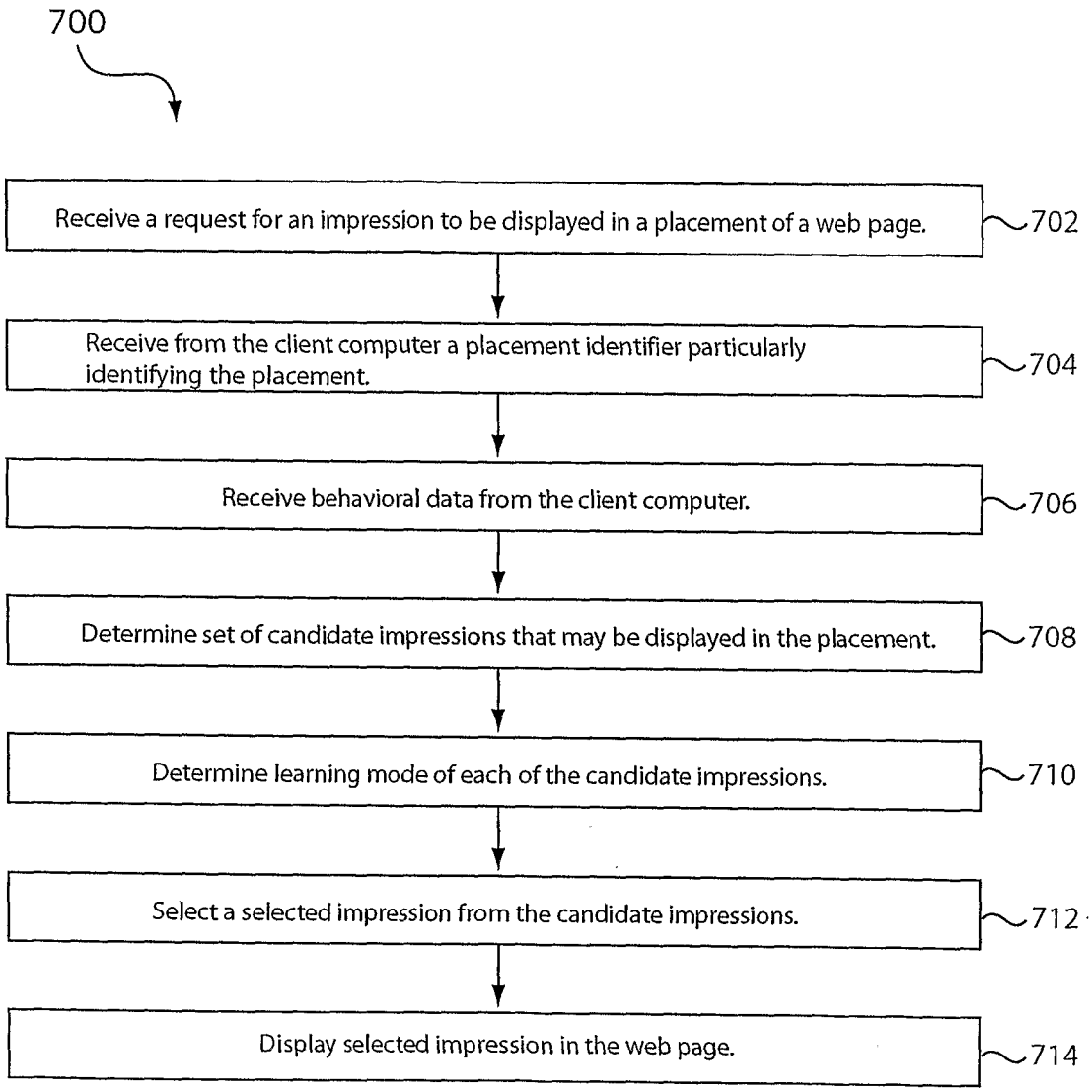
700
Receive a request for an impression to be displayed in a placement of a web page.
702
Receive from the client computer a placement identifier particularly identifying the placement.
704
Receive behavioral data from the client computer.
706
Determine set of candidate impressions that may be displayed in the placement.
708
Determine learning mode of each of the candidate impressions.
710
Select a selected impression from the candidate impressions.
712
Display selected impression in the web page.
714

FIG. 7