(54) Title: MONITORING SYSTEM

(customer's computer) -> (Web Page Provider Server) -> (Internet) -> (Advertiser's Web Server) -> (IWSM Server)
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
NETWORK USAGE MONITORING SYSTEM

The present invention relates to a monitoring process and a system for executing that process, and in particular to a process that can be used to monitor user behaviour and usage on a network such as the Internet.

A major component of electronic commerce on the Internet is the placement of advertising in web pages. In return for including advertisements, web page providers are able to obtain income from advertisers. However, the methods by which these charges are determined are not entirely satisfactory, being primarily based on the following:

(i) a simple rental fee for the placement of the advertising;
(ii) the number of “hits” on the advertisement; and/or
(iii) a percentage of the revenues resulting from visits to the merchant’s site.

The first two methods are trivial to implement, but may not be desirable from an advertiser’s perspective, since the relationship between the presence of an advertisement on a given web page and the number of hits it receives are not clearly linked to product sales or services. The third method may be the most desirable for both the web site provider and the advertiser, since it is linked to actual revenues. Presently, charges under this model are determined on the basis of reports provided by the advertiser, or by the installation of special reporting software on the advertiser’s site or the customer’s computer. However, the former does not provide a way for the web page provider to verify the accuracy of the reports, and the latter requires the advertiser or the customer to agree to the installation of the appropriate software. It is desired to provide at least provide a useful alternative, and in particular a method that can be used to accurately and automatically determine the effectiveness of referring links in advertisements on web pages, so as to determine the appropriate fees for placing that advertisement. It is also desired to provide in particular a monitoring process that can be used for a range of monitoring applications, such as customer behaviour and usage patterns over the Internet.
The present invention relates to a monitoring process, including:
receiving a first access request from a first computer device including a modified link
of network data, said modified link including link data representing an original link;
extracting said link data from said modified link; and
sending a second access request to a second computer device including said original link.

Preferably the monitoring process further includes:
receiving a response to said second access request from said second computer device;
modifying original links in said response to generate respective modified links including
link data representing said original links; and
sending said response with said modified links to the first computer device.

The present invention also provides a monitoring process executed by a server,
including:
receiving an access request including a first link modified to direct the request to the server, said first link including link data representing a second link to another server;
sending an access request with the second link to the other server and receiving in response a page corresponding to the second link;
modifying third links in the page to include modified links to the server with link data representing the third links, respectively; and
sending the page to a computer device.

Preferred embodiments of the present invention are hereinafter described, by way of example only, with reference to the accompanying drawings, wherein:
Figure 1 is a block diagram of a preferred embodiment of a monitoring system, showing the interaction of a customer’s computer with the monitoring system and an advertiser’s web server; and
Figure 2 is a schematic representation of the process flow for the monitoring system.
A typical web server 4 of a web page provider, as shown in Figure 1, may provide content of interest below an advertisement placed prominently as a "banner" across the top of any given web page. The advertisement is usually a graphic image which also serves to define an area of the page as a hyperlink to the advertiser's web site on a server 8. When a potential customer uses a computer 2 to select within the area defined by the advertisement, the customer's web browser is redirected to the advertiser's web site via the Internet 6, and subsequent transactions between the customer and the advertiser can take place between the customer's browser and the advertiser's web server without further involvement of the referring web page server 4.

A monitoring system, as shown in Figure 1, comprises an Intelligent Web Site Monitor (IWSM) server 10 that includes an interceptor module 14 so the server 10 acts like a filtering server between the browser on the customer's computer 2 and the advertiser's web server 8. As part of an IWSM process executed by the server 10, the advertisement hyperlinks in the web page provider's site are adjusted to not refer directly to an advertiser's web site on the server 8, but instead refer to the IWSM server 10 with the URL of the advertiser's web site or page passed as data.

When a customer clicks on an advertisement, the customer's browser sends an access request to the IWSM server 10. The IWSM module 14 determines the advertiser's URL, logs the request, and then sends the request to obtain in response the corresponding web page from the advertiser's web server 8. In this sense the server 10 acts somewhat like a conventional proxy server. However, before passing the web page on to the customer's browser, the module 14 replaces all hyperlink and form references to the advertiser's web server with encoded versions which refer to the IWSM server 10 rather than the advertiser's web server but which also include the advertiser's URLs as data. Thus, when the customer clicks on any http hyperlink or submits any forms or data which would normally access the advertiser's server or servers 8, the http requests and messages are instead directed to the IWSM server 10. Before any forms are received at the advertiser's web server, any form data of interest is logged. Messages sent back to the customer's browser from the advertiser's web are also logged by
the IWSM server 10. Thus the IWSM server 10 logs all transactions of interest between the customer 2 and the advertiser 8 subsequent to the customer clicking on the advertisement.

The IWSM process steps are described in further detail with reference to Figure 2 for the following example. A customer browsing a web page provider’s site clicks on merchant1’s advertisement. Normally, the URL corresponding to this action would be http://merchant1.com/sales.htm, and the merchant’s page would be loaded directly into the customer’s browser. However, according to the IWSM process, this URL is instead previously encoded into a new URL which refers to the provider’s IWSM server 10, but includes the merchant’s URL as data, http://IWSM.provider.com?merchant1.com/sales.htm. Thus, the customer’s browser connects to the provider’s IWSM server 10, as shown in Figure 2, at step 1, rather than the merchant’s server. The interceptor module 14 determines the merchant’s URL at step 2, logs the request at step 3, and gets the corresponding web page, sales.htm, from merchant1.com at step 4. All references to the merchant1.com web server in hyperlinks and forms in the returned web page are modified by the module 14 to refer to the IWSM server itself, with the original references encoded, at step 5. The modified page is then returned to the customer’s browser, at step 6. Also any transaction data or data of interest is logged at step 5 by the IWSM server. Because each data transfer of interest is logged by the IWSM server, all financial and service transactions between the customer and the merchant’s site are available for analysis. Because the transactions are associated by readily available data which may include customer host identification, timestamps and the original referring page, the revenue and/or services generated by a particular advertisement on a particular web page may be determined. For instance the logged data may include the JavaScript variable document.referrer, and server environment variables such as REMOTE_ADDR, REMOTE_IDENT, and REMOTE_USER, or a dynamically generated SESSION_ID.

The analysis of the logged data may be executed by a data mining/reporting module 16, as shown in Figure 1. The primary factor of interest may be the merchant revenues generated by a particular advertisement on a particular web page. For merchants who adopt the Electronic Commerce Modeling Language (ECML) standard, the standard is used to determine
which data fields of a form require logging by the interceptor module 16. For merchants not
conforming to any form data standard, the module 16 is adjusted to identify the correct fields.
This information can then be used to determine the fees to be paid by the advertiser to the web
page provider.

To reduce performance penalties resulting from the addition of the IWSM server, the
IWSM server can pre-fetch, modify and cache the links referring to the advertiser’s servers
after the modified version of the advertiser’s page has been sent to the customer’s browser. To
further enhance performance, the advertiser’s CGI scripts can also be mirrored to the IWSM
server.

A link in the context of this specification includes a URL, a URI, a hyperlink, or any
data which identifies a resource, such as a document, and is sent using a communications
protocol, such as HTTP or FTP.

The modules 14 and 16 of the server 10 are preferably software modules that execute
on the server 10 to implement the IWSM process, and the server 10 is a standard computer
system that acts as a web server. Alternatively, the steps of the IWSM process can be executed
at least in part by dedicated hardware components, such as ASICs, of the server 10. The
computer 2 may be a personal computer, handheld computer, mobile telephone or any other
such device.

The IWSM process can be used for a range of monitoring applications, such as
monitoring customer behaviour and usage patterns over the Internet.

Many modifications will be apparent to those skilled in the art without departing from
the scope of the present invention as herein described with reference to the accompanying
drawings.
CLAIMS:

1. A monitoring process, including:
   receiving a first access request from a first computer device including a modified link
   of network data, said modified link including link data representing an original link;
   extracting said link data from said modified link; and
   sending a second access request to a second computer device including said original
   link.

2. A monitoring process as claimed in claim 1, including receiving a response to said
   second access request from said second computer device;
   modifying original links in said response to generate respective modified links including
   link data representing said original links; and
   sending said response with said modified links to the first computer device.

3. A monitoring process as claimed in claim 2, including recording data passed between
   the first and second computer devices.

4. A monitoring process as claimed in claim 2, including recording transaction data
   passed between the first and second computer devices.

5. A monitoring process as claimed in claim 2, including maintaining a log of
   predetermined data transfers between the first and second computer devices.

6. A monitoring process as claimed in claim 2, wherein the first computer device is for
   a customer and said second computer device serves web pages of an advertiser.

7. A monitoring process as claimed in claim 5, wherein said predetermined data transfers
   represent service or financial transactions.
8. A monitoring process as claimed in claim 2, wherein said network data is markup language data.

9. A monitoring process as claimed in claim 2, wherein said original links are links of advertisements of a page.

10. A monitoring process as claimed in claim 3, wherein said data includes data identifying a customer.

11. A monitoring process as claimed in claim 3, including analysing said data to determine transactions generated by advertisements corresponding to said original links.

12. A monitoring process as claimed in any one of the preceding claims, including modifying said original link of said network data to generate the modified link in said network data.

13. A monitoring system having components for executing the steps of the method as claimed in any one of the preceding claims.

14. A server having components for executing the steps of the method as claimed in any one of claims 1 to 12.

15. Software stored on a computer readable storage medium and having code for executing the steps of the method as claimed in any one of claims 1 to 12.

16. A monitoring process executed by a server, including:
    receiving an access request including a first link modified to direct the request to the server, said first link including link data representing a second link to another server;
    sending an access request with the second link to the other server and receiving in response a page corresponding to the second link;
modifying third links in the page to include modified links to the server with link data representing the third links, respectively; and
sending the page to a computer device.

17. A server having an interceptor module for executing the steps of claim 16; and
a data module for storing predetermined data passed between the computer device and the other server.
Figure 1
Figure 2

Customer

Service provider
IWSM application

Merchant
web site


clicks on
ad in service
provider
web site

"http://IWSM.provider.com?
merchant1.com/sales.htm"

Step 1

Step 2

determine merchant
URL

Step 3

log transaction

Step 4

"http://merchant1.com/sales.htm"

Page-1

Modified link to pg2a
Modified link to pg2b

......

Page-1

Link to pg2a
Link to pg2b

......

Step 6

modify links

Step 7

......
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

Int. Cl. 7: G06F 17/60, 11/34

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

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC G06F

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

AU:IPC AS ABOVE

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

WPAT, USPTO

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<th>Relevant to claim No.</th>
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<td>A</td>
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<td>A</td>
<td>WO 0042735A, BRITISH TELECOMMUNICATIONS PLC, 20 July 2000</td>
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X Further documents are listed in the continuation of Box C

X See patent family annex

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Date of the actual completion of the international search

12 July 2001

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