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(54) **Title:** METHOD FOR ANALYZING THE USAGE OF A WEB PAGE AND VISUALIZATION AND ANALYSIS TOOL

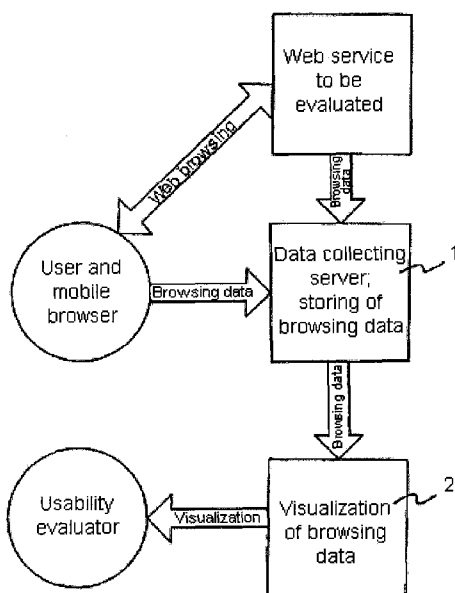


Fig. 1

(57) **Abstract:** The invention is directed to a method for analyzing the usage of a web page, making use of information about the actions of users of the web page. In accordance with the invention, the method comprises a step in which the web page is divided into a set of areas; the transparency of the areas is arranged to change so that the actions of the user of the web page in each area of the page correlate with the transparency; and the usage of the web page is analyzed on the basis of the transparency of the areas. The invention is also directed to a web page visualization and analysis tool utilizing the method.

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Method for analyzing the usage of a web page and visualization and analysis tool

The invention is directed to a method according to the preamble of claim 1 for analyzing the usage of a web page.

- 5 The invention is also directed to a web page visualization and analysis tool according to the preamble of claim 7.

Computer based devices, especially browsers and mobile devices, have become wide-spread and are commonly used to browse web pages ('web' referring to the World Wide Web, or WWW, which is part of the world-wide computer network also called the Internet). Usually, providers of web pages do not produce separate
10 pages for mobile communication devices but, instead, the pages designed for the displays of ordinary computers will be used in mobile devices within the limits dictated by their user interfaces. The display of a mobile device may be a few inches in diameter whereas the display of a desktop computer can be 22 inches, for example. Using ordinary web pages in mobile devices often requires the use of a
15 zooming function (making page larger/smaller), positioning the display on a certain area of the page, and making selections, such as using a finger to choose one of adjacent links on a touch screen. This is problematic as the use of the web page takes extra time. An additional problem with a mobile device having a touch
20 screen is that the user possibly considers it awkward to use. On the other hand, problems may be associated with a web site which may be difficult to use, especially when browsed on a mobile device.

An object of the invention is to chart and illustrate the problems related to the use of web pages or similar service pages downloadable from a network service, for
25 example, and thereby also to help find new solutions to make the use of web pages easier. Another object of the invention is to provide a new improved method for analyzing a web page and a visualization and analysis tool.

The method according to the invention for analyzing a web page is characterized by that which is expressed in claim 1.

- 30 The web page visualization and analysis tool according to the invention is characterized by that which is expressed in claim 7.

Advantageous embodiments of the invention are presented in the dependent claims.

The invention is directed to a method for analyzing the usage of a web page, making use of information about the actions of users of the web page. In the method
5 according to the invention,

- a web page is divided into a set of areas;
- transparency of the areas is arranged to change so that the actions of the user of the web page in each area of the page correlate with the transparency; and
- the usage of the web page is analyzed on the basis of the transparency of the
10 areas.

'Actions of the user' refer in general to the actions directed by the user onto a given web page, such as the use of the zooming function (zooming in/out), navigation, positioning the display at a certain point of the web page, making selections, misclicks and instant returns and so forth.

- 15 In an advantageous embodiment of the invention one or more colors are used in the areas to represent one or more different actions directed by the user onto the web page.

In an advantageous embodiment of the invention the areas form a grid the squares of which cover the web page.

- 20 In an advantageous embodiment of the invention the transparency is divided into a suitable number of discrete categories between 0 and 1 where 0 represents full transparency and 1 represents non-transparency, or opacity.

In an advantageous embodiment of the invention, the transparency is divided into at least three discrete categories between 0 and 1.

- 25 In an advantageous embodiment of the invention, a '1' in the transparency category system represents the most popular action areas on the web page.

The invention is also directed to a web page visualization and analysis tool, making use of information about the actions of users of the web page. According to the invention, the tool comprises

- 30 - a means for dividing the web page into a set of areas;

- a means for arranging the transparency of each area to change so that the actions of the user of the web page in each area of the page correlate with the transparency; and

5 - a presentation means where the usage of the web page is analyzed on the basis of the transparency of the areas.

In an advantageous embodiment of the invention the tool comprises a means for applying one or more colors to the areas to represent one or more different actions directed by the user onto the web page.

10 In an advantageous embodiment of the invention, the web page can be divided into a set of areas, comprises a means for generating a grid, the grid squares covering the web page.

15 In an advantageous embodiment of the invention, the tool comprises a means for dividing the transparency into a suitable number of discrete categories between 0 and 1 where 1 represents full transparency and 0 represents non-transparency, or opacity.

In an advantageous embodiment of the invention, there are at least three transparency categories between 0 and 1.

20 One of the advantages of the method and tool according to the invention is that it makes it easy to evaluate the effects of changes in a web page on different time scales and also evaluate the quality of the web pages.

Another advantage of the invention is that it makes it possible to compare the need of zooming as well as the number of misclicks in the different mobile devices and browsers, thereby helping the evaluation of web pages as regards suitability for mobile applications, for instance.

25 The invention and its further advantages are below described in more detail with reference to the accompanying drawing, where

Fig. 1 illustrates, in a flow diagram, a method according to the invention for analyzing a web page and a corresponding tool.

30 A user connects to a web site or a corresponding service site downloadable from a network service by means of a mobile browser on a mobile device, for example, and browses the web pages or service pages. The user's actions on each web

page are registered and action data are collected at step 1 by an appropriate means into the memory of a data collecting server or a similar information gathering means.

5 While collecting action data, context information may also be collected at the same time, meaning information related to the instance of usage during the browsing session, and this information can be saved in the memory of the data collecting server.

10 There exist many alternative ways to collect data and forward them to the data collecting server. Web browsing is based on the HTTP protocol in which the terminal sends to the server an HTTP request to which the HTTP server responds with an HTTP response comprising the contents of a service page, for example. The HTTP request includes header fields containing various data, such as the name of the browser application and the size of the message in bytes, for instance. Other header fields can be added to such a (request) message, or a similar one, and
15 thereby, action and/or context information can be sent within the message to the HTTP server which forwards the data to the data collecting server. The server reads the header fields in the request message and uses the information contained in the header fields to analyze the web page/site.

20 In accordance with the invention, the user action data collected by the data collecting server from the web page are visualized. This means that the web page is divided into a set of areas preferably covering the whole web page. In an advantageous embodiment of the invention the web page is divided into a grid the squares of which cover the web page. The transparency of the areas, such as grid squares, is arranged to change so that the actions of the user of the web page in
25 each area of the page correlate with the transparency. The results are then presented on a suitable means of presentation, such as a display, to a (usability) evaluator or a corresponding person who analyzes the usage of the web page on the basis of the transparency of the grid squares.

30 The method according to the invention and the corresponding tool make use of information about a user's actions, such as movements, selections and zooming operations, within a single web page, which information is collected and stored in a data collecting server. The evaluator, if he desires, may also choose the suitable context-related attributes as a basis for the evaluation from the following: the web page, browser, device, time of day, weather, temperature, location, and the activity
35 level of the user. The evaluator may also choose in the method and corresponding

tool whether the visualization shows from the user's actions only the most common zooming area or, for example, the three most common areas, misclicks or instant returns from selected links.

5 In an advantageous embodiment of the method and corresponding tool according to the invention, the most popular positioning and zooming areas are shown as fully transparent (transparency = 1) areas, such as grid squares. The next most popular area, such as grid square, is masked with a blue-grey (or similar light) shade of color which is partially transparent (transparency 0.8, for example, on a scale of 1 to 0) and the least popular area, such as grid square, is masked with a grey (or
10 similar relatively dark) shade of color which also is partially transparent (transparency 0.5, for example, on a scale of 1 to 0) but the transparency of which is less than that of the blue-grey shade mentioned above. Thus the visualization transparency is divided into three discrete categories between 0 and 1.

15 In an advantageous embodiment of the method and corresponding tool according to the invention, different colors are used to represent various user's selections. Then, a red transparent area, such as grid square, can be used to represent the areas where misclicks have been made, for example. Similarly, the most popular and most often used links (and areas/squares) are represented by a green transparent coloring realized e.g. as a strikethrough (or a rectangle) on the link, and the
20 links which caused instant returns are represented by a blue transparent coloring (realized e.g. as a strikethrough or rectangle on the link).

The invention makes it possible to compare navigation events within a single web page, such as scrolling, zooming, link selections, misclicks, and instant returns, on different devices, browsers and at different moments of time, e.g. from a touch
25 screen equipped mobile communication device. The invention makes possible a quick context based development of a positive user experience of web services to be used on mobile communication devices. The invention can be used to quickly generate various analyzes and summaries by means of which it is possible to compare the differences, consistencies, drawbacks and strengths of different mobile devices, their browsers and the users' browsing contexts, for example, in the
30 most common browsing mode in the world - navigation within a single web page. Furthermore, the invention can be used to analyze and determine the effects of changes done on a service's page on the usage of the page e.g. on different time scales, whereby it is possible to determine the effect of the changes made on the
35 page, such as content editing (advertising or the like), on the usability of the page and, thus, on the business.

In particular the invention can be used to support a comparative analysis of navigation and zooming on a web page with a touch-screen equipped mobile device, for example. (Other) context information from the mobile device can be combined with action data, such as navigation data. The invention can be used to visualize data collected in a database and analyzed, which data concerns user's movements, selections and/or zoom operations within a single web page.

In addition, the mobile device may have one or more interfaces and/or sensors to monitor the user's physical motion and environment. Acceleration, location, audio data from a microphone, visual information from a camera etc. make possible different context classifications based on decision-making algorithms. Context information which advantageously includes a visual indication (camera) can be generated e.g. an XML description and send this through a (separate) data link from the mobile device to the server of the arrangement. In practice, this can be implemented using a separate background process in the mobile device, therefore not necessitating an HTTP request from the browser for the transmission of the data. The background process may transmit the data using the HTTP POST method to the server of the arrangement e.g. at regular intervals or at intervals specified in some other way. The information is advantageously sent as payload in the HTTP request in the XML format. The context information indicates e.g. the motion status derived from the acceleration data and describes the browser view on the mobile device at the moment of the time stamp.

The invention is not limited to apply solely to the exemplifying embodiment described above but many modifications and variations are possible within the scope of the inventional idea defined by the claims.

Claims

1. A method for analyzing the usage of a web page, making use of information about the actions of users of the web page, **characterized** in that in the method,
 - a web page is divided into a set of areas;
- 5 - transparency of the areas is arranged to change so that the actions of the user of the web page in each area of the page correlate with the transparency; and
 - the usage of the web page is analyzed on the basis of the transparency of the areas.
- 10 2. A method according to claim 1 for analyzing the usage of a web page, **characterized** in that the areas are marked with one or more colors to represent one or more different actions directed by a user to the web page.
3. A method according to claim 1 or 2 for analyzing the usage of a web page, **characterized** in that the areas form a grid the squares of which cover the web page.
- 15 4. A method according to claim 1, 2 or 3 for analyzing the usage of a web page, **characterized** in that the transparency is divided into a suitable number of discrete categories between 0 and 1, where 1 represents full transparency and 0 represents non-transparency, or opacity.
- 20 5. A method according to claim 4 for analyzing the usage of a web page, **characterized** in that the transparency is divided into at least three discrete categories between 0 and 1.
6. A method according to claim 4 or 5 for analyzing the usage of a web page, **characterized** in that in the transparency categorization, '1' represents the most popular interaction areas on the web page.
- 25 7. A web page visualization and analysis tool, which makes use of information about the actions of users of the web page, **characterized** in that the tool comprises
 - a means for dividing the web page into a set of areas;

- a means for arranging the transparency of each area to change so that the actions of the user of the web page in each area of the page correlate with the transparency; and

5 - a presentation means where the usage of the web page is analyzed on the basis of the transparency of the areas.

8. A web page visualization and analysis tool according to claim 7, **characterized** in that the tool comprises a means for applying one or more colors to the areas to represent one or more different actions directed by the user onto the web page.

10 9. A web page visualization and analysis tool according to claim 7 or 8, **characterized** in that the means, by which the web page can be divided into a set of areas, comprise a means for creating a grid the squares of which cover the web page.

15 10. A web page visualization and analysis tool according to claim 8 or 9, **characterized** in that the tool comprises a means by which the transparency is divided into a suitable number of discrete categories between 0 and 1, where 0 represents full transparency and 1 represents non-transparency, or opacity.

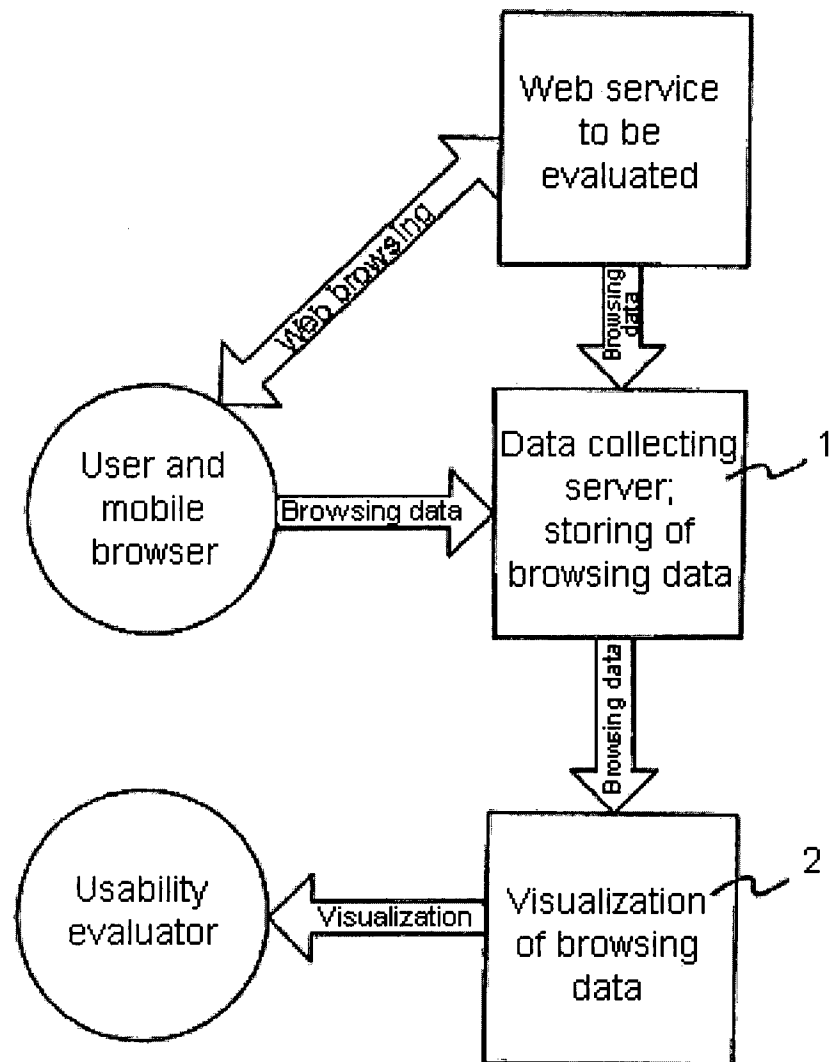


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER See extra sheet 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: G06Q, G06F Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched FI, SE, NO, DK Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI, Internet		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6608615 B1 (MARTINS FERNANDO C M) 19 August 2003 (19.08.2003) abstract; column 4, line 49 – column 5, line 65	1-10
X	'Interactive Click Heatmap Joins ClickTale Heatmap Suite'. ClickTale [online blog posting]. August 12, 2009 [retrieved 2011-06-23]. Retrieved from the internet: <URL: http://blog.clicktale.com/2009/08/12/interactive-click-heatmap-joins-clicktale-heatmap-suite/ > the whole document	1-10
X	US 6154752 A (RYAN ROBERT) 28 November 2000 (28.11.2000) abstract; Figures 2C and 2D; column 1, line 49 – column 2, line 3	1-10
X	US 6037935 A (BATES CARY LEE et al.) 14 March 2000 (14.03.2000) abstract; column 1, line 65 – column 2, line 13; column 8, lines 38-54	1-10
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
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Date of the actual completion of the international search 29 June 2011 (29.06.2011)		Date of mailing of the international search report 01 July 2011 (01.07.2011)
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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5973663 A (BATES CARY LEE et al.) 26 October 1999 (26.10.1999) abstract; Figure 3; column 2, line 44 – column 3, line 19; column 6, lines 31–40	1-10
A	US 5787254 A (MADDALOZZO JR JOHN et al.) 28 July 1998 (28.07.1998) abstract; Figures 9-10; column 10, lines 50-67	

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US 6154752 A	28/11/2000	None	
US 6037935 A	14/03/2000	None	
US 5973663 A	26/10/1999	US 5532715 A EP 0538166 A2 JP 5210479 A CA 2071455 A1	02/07/1996 21/04/1993 20/08/1993 17/04/1993
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