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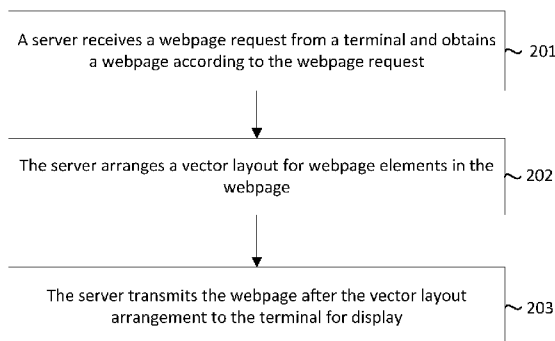


FIG. 2

(57) Abstract: In a method for displaying a webpage, a server receives a webpage request from a terminal, obtains a webpage according to the webpage request, arranges a vector layout for webpage elements in the webpage, and transmits the webpage after the vector layout arrangement to the terminal, such that the terminal displays the webpage and zooms in or zooms out the webpage elements in the webpage according to a webpage zooming instruction.



METHOD AND APPARATUS FOR DISPLAYING A WEBPAGE

PRIORITY STATEMENT

[0001] This application claims the benefit of Chinese Patent Application No. 201210549940.7, filed on December 18, 2012, the disclosure of which is incorporated herein in its entirety by reference.

FIELD

[0002] The present disclosure relates to information processing techniques, and more particularly, to a method and an apparatus for displaying a webpage.

BACKGROUND

[0003] At present, there are mainly two webpage displaying methods in smart terminal browser fields. In one method, a webpage processing engine (e.g., Webkit, Presto, etc.) is configured in a smart terminal to retrieve and parse a webpage and arrange the layout. This method simplifies the development of the smart terminal. But the smart terminal has to have a strong hardware processing ability, e.g., high speed CPU, large memory, and high network speed, etc. In the other method, a "thin client technique" is adopted. The webpage processing engine is configured at a server end. Operations such as webpage retrieving, parsing and layout arrangement are implemented by a series of background servers. The smart terminal merely needs to receive and display a webpage whose layout has been arranged. This displaying mode is hard to develop, but the terminal needs less hardware resources to display the webpage, e.g., less CPU, less memory and network resources.

SUMMARY

[0004] According to an example of the present disclosure, a method for displaying a webpage is provided. The method includes:

- receiving, by a server, a webpage request from a terminal;
- obtaining, by the server, a webpage according to the webpage request;
- arranging, by the server, a vector layout for webpage elements in the webpage; and
- transmitting, by the server, the webpage after the vector layout arrangement to the terminal, such that the terminal displays the webpage and zooms in or zooms out the webpage elements in the webpage according to a webpage zooming instruction.

[0005] According to another example of the present disclosure, an apparatus for displaying a webpage is provided. The apparatus includes:

one or more processors;

a memory; and

one or more program modules stored in the memory and to be executed by the one or more processors, the one or more program units comprise:

a webpage request receiving unit, adapted to receive a webpage request from a terminal and obtain a webpage according to the webpage request;

a vector layout arranging unit, adapted to arrange a vector layout for webpage elements in the webpage; and

a webpage transmitting unit, adapted to transmit the webpage after the vector layout arrangement to the terminal, such that the terminal displays the webpage and zooms in or zooms out the webpage elements in the webpage according to a webpage zooming instruction.

[0006] According to still another example of the present disclosure, a non-transitory computer-readable storage medium comprising a set of instructions for displaying a webpage is provided, the set of instructions to direct at least one processor to perform acts of:

receiving a webpage request from a terminal;

obtaining a webpage according to the webpage request;

arranging a vector layout for webpage elements in the webpage; and

transmitting the webpage after the vector layout arrangement to the terminal, such that the terminal displays the webpage and zooms in or zooms out the webpage elements in the webpage according to a webpage zooming instruction.

[0007] Other aspects or embodiments of the present disclosure can be understood by those skilled in the art in light of the description, the claims, and the drawings of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Features of the present disclosure are illustrated by way of example and not limited in the following figures, in which like numerals indicate like elements, in which:

[0009] FIG. 1 is a schematic diagram illustrating a computer system according to an example of the present disclosure.

[0010] FIG. 2 is a flowchart illustrating a method for displaying a webpage according to an example of the present disclosure.

[0011] FIG. 3 is a schematic diagram illustrating the encapsulation of webpage elements according to an example of the present disclosure.

[0012] FIG. 4 is a schematic diagram illustrating a webpage before a zoom out

operation according to another example of the present disclosure.

[0013] FIG. 5 is a schematic diagram illustrating the webpage after the zoom out operation according to an example of the present disclosure.

[0014] FIG. 6 is a schematic diagram illustrating a structure of an apparatus for displaying a webpage according to another example of the present disclosure.

DETAILED DESCRIPTION

[0015] The present disclosure will be described in further detail hereinafter with reference to accompanying drawings and examples to make the technical solution and merits therein clearer.

[0016] For simplicity and illustrative purposes, the present disclosure is described by referring to examples. In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present disclosure. It will be readily apparent however, that the present disclosure may be practiced without limitation to these specific details. In other instances, some methods and structures have not been described in detail so as not to unnecessarily obscure the present disclosure. As used herein, the term “includes” means includes but not limited to, the term “including” means including but not limited to. The term “based on” means based at least in part on. In addition, the terms “a” and “an” are intended to denote at least one of a particular element.

[0017] Conventionally, smart terminals using the thin client technique adopt single-touch screens. The smart terminals display webpages whose layouts have been arranged by a background server. Users cannot zoom in or zoom out the webpages freely.

[0018] In contrast, an example of the present disclosure provides a method for displaying a webpage, such that a user can zoom in or zoom out the webpage displayed in a browser of a smart terminal with a multi-touch screen.

[0019] FIG. 1 is a schematic diagram illustrating a computer system according to an example of the present disclosure. A server 110 may be a computing device capable of executing a method and apparatus of present disclosure. The smart terminal 120 may, for example, be a device such as a smart phone, Personal Computer (PC), Personal Digital Assistant (PDA), tablet PC, etc.

[0020] The terminal 120 may include a variety of operating systems such as Android, Palm OS, Symbian, Windows mobile, Linux, iPhone OS, Black Berry OS 6.0, Windows Phone, etc.

[0021] If the terminal 120 executes an Android operating system, any one of the following edition may be adopted: Android Beta, Android 1.0, Cupcake (Android 1.5), Donut (Android 1.6), Eclair (Android 2.0/2.1), Froyo (Android 2.2), Gingerbread (Android 2.3), Honeycomb (Android 3.0), Ice cream Sandwich (Android 4.0), Jelly Bean (Android 4.1), etc.

[0022] Some Android editions are listed in the above. Those with ordinary skill in the art should know that the solution of the present disclosure is not restricted to the above listed editions. Other editions are also applicable.

[0023] The server 110 may vary in terms of capabilities or features. Claimed subject matter is intended to cover a wide range of potential variations. For example, the server 110 may include may execute a variety of operating systems 141 and a variety of possible applications 142, such as a webpage displaying application 145.

[0024] Further, the server 110 may include one or more non-transitory processor-readable storage media 130 and one or more processors 122 in communication with the non-transitory processor-readable storage media 130. For example, the non-transitory processor-readable storage media 130 may be a RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, hard disk, a removable disk, a CD-ROM, or any other form of non-transitory storage medium known in the art. The one or more non-transitory processor-readable storage media 130 may store sets of instructions, or units and/or modules that comprise the sets of instructions, for conducting operations described in the present application. The one or more processors may be configured to execute the sets of instructions and perform the operations in example embodiments of the present application.

[0025] FIG. 2 is a schematic diagram illustrating a method for displaying a webpage according to an example of the present disclosure. FIG. 2 is a simplified diagram according to one embodiment of the present invention. This diagram is merely an example, which should not unduly limit the scope of the claims. One of ordinary skill in the art would recognize many variations, alternatives, and modifications.

[0026] As shown in FIG. 2, the method includes the following.

[0027] At block 201, a server receives a webpage request from a terminal and obtains a webpage according to the webpage request.

[0028] Herein, the server may obtain the webpage from a third party website according to the webpage request or obtain the webpage from a cache of the server itself according to the webpage request.

[0029] At block 202, the server obtains webpage elements in the webpage and arranges a vector layout for the webpage elements.

[0030] In this block, the server retrieves webpage elements (e.g., text, pictures, controllers, etc.) from the webpage, configures rendering attribute information for each webpage element and encapsulates the webpage element and its rendering attribute information into a webpage element layout packet.

[0031] The process of encapsulating the webpage element and its rendering attribute information into the webpage element layout packet is referred to as vector layout arrangement.

[0032] For example, each webpage element may be arranged in a rectangle area which includes a content area (i.e., contents of the webpage element). The content area may include text, picture or controller (e.g., icon, input box, and list box), etc. The rectangle area and the content area may have different rendering attribute, e.g., color, margin width, etc. These information are determined by the rendering attribute information.

[0033] It should be noted that, although the rectangle area is taken as an example to describe the encapsulation of the webpage element, those with ordinary skill in the art should know that the webpage element may also be encapsulated into other shapes.

[0034] FIG. 3 is a schematic diagram illustrating the encapsulation of a webpage element layout packet according to an example of the present disclosure.

[0035] The rendering attribute information determines the way that the webpage element layout packet and the webpage elements in the webpage element layout packet are displayed. The rendering attribute information may include a common attribute which is applicable for each webpage element layout packet and a dedicated attribute which is dedicated for a specific webpage element layout packet.

[0036] For example, a common attribute may include the following:

[0037] X: denotes X coordinate of a webpage element layout packet in a webpage document.

[0038] Y: denotes Y coordinate of the webpage element layout packet in the webpage document.

[0039] WIDTH: denotes the width of the webpage element layout packet.

[0040] HEIGHT: denotes the height of the webpage element layout packet.

[0041] BG_COLOR: denotes a background color of the webpage element layout packet.

[0042] PADDING_LEFT: denotes a left margin of the contents in the webpage element layout packet to the webpage element layout packet.

[0043] PADDING_TOP: denotes a top margin of the contents in the webpage element layout packet to the webpage element layout packet.

[0044] PADDING_RIGHT: denotes a right margin of the contents in the webpage element layout packet to the webpage element layout packet.

[0045] PADDING_BOTTOM: denotes a bottom margin of the contents in the webpage element layout packet to the webpage element layout packet.

[0046] For example, if the webpage element is text, the rendering attribute information may further include at least one of: FONT_SIZE: size of text; FONT_STYLE: style of text (traditional, bold, Italic); FONT_COLOR: color of text; URL: link in text; VALUE: content of text.

[0047] If the webpage element is a picture, the rendering attribute information of the webpage element may further include a link or a replacement text if the picture is not

available.

[0048] If the webpage element is a controller, the rendering attribute information of the webpage element further includes a controller type. The controller may be any one of the following: icon controller, list box controller, single-line text/password inputting box controller, multi-line text inputting box controller, file upload controller, drawer controller, single selection controller, or multi-selection controller.

[0049] The text may be traditional text or text with a hyperlink. If the attribute include a valid URL attribute, the text is hyperlink text and can be clicked, otherwise, the text is traditional text. The two kinds of texts may be displayed by different colors.

[0050] For a picture, if its attribute includes a valid URL attribute, the picture is a hyperlink picture; otherwise, the picture is a traditional picture. A picture with a hyperlink may be clicked to open a new link.

[0051] At block 203, the server transmits the webpage after the vector layout arrangement to the terminal for display.

[0052] In this block, the server transmits the element layout packet to the terminal which obtains the webpage elements and their rendering attribute information from the webpage element layout packet and renders the webpage elements according to the rendering attribute information to display the webpage.

[0053] In this block, the terminal may display the shape of the webpage element layout packet as invisible.

[0054] When user's fingers perform a zoom-in/zoom-out operation on the multi-touch screen of the terminal, the terminal detects a webpage zooming instruction and determines a zooming proportion according to the webpage zooming instruction. According to the zooming proportion, the terminal performs a vector zooming operation to the webpage element layout packet and the webpage elements, wherein the webpage element layout packet is configured as invisible.

[0055] FIG. 4 is a schematic diagram illustrating a webpage before a zooming operation according to an example of the present disclosure. FIG. 5 is a schematic diagram illustrating a webpage after the zooming operation is performed according to an example of the present disclosure.

[0056] As shown in FIG. 4, the server encapsulates six webpage element layout packets, respectively are A1, A2, B1, B2, C1 and C2; wherein content areas of A1 and A2 are text contents, content areas of B1 and B2 are picture contents, and content areas of C1 and C2 are controller contents.

[0057] The layout of the webpage element packets on the screen of the terminal is A1 (0, 0, 40, 20), A2 (0, 20, 40, 40), B1 (40, 0, 80, 20), B2 (40, 20, 80, 40), C1 (80, 0, 120, 20), and C2 (80, 20, 120, 40).

[0058] If the user enlarges the webpage to times (e.g., 1.5 times) of the original size,

each webpage element is multiplied by the corresponding times 1.5.

[0059] As shown in FIG. 4:

A1*1.5, area coordinates of A1 are (0, 0, 60, 30);

A2*1.5, area coordinates of A2 are (0, 30, 60, 60);

B1*1.5, area coordinates of B1 are (60, 0, 120, 30);

B2*1.5, area coordinates of B2 are (60, 30, 120, 60);

C1*1.5, area coordinates of C1 are (120, 0, 180, 30);

C2*1.5, area coordinates of C2 are (120, 30, 180, 60).

[0060] In addition, the rendering attribute value of the area content of each area should also be multiplied by the corresponding enlarge times. For example, the top margin of the text area in packet A1 changes from 4 to $4*1.5=6$; the bottom margin of the text area in packet A1 changes from 4 to $4*1.5=6$, the left margin of the text area in packet A1 changes from 4 to $4*1.5=6$; the right margin of the text area in packet A1 changes from 4 to $4*1.5=6$.

[0061] Similarly, the multiplying operation is also performed to content areas in other packets.

[0062] It can be seen from FIG. 4 and FIG. 5 that, the layout of the elements is still normal after being enlarged. Although there are various kinds of webpage elements, the vector layout may be implemented by the server according to the examples of the present disclosure.

[0063] An example of the present disclosure further provides an apparatus for displaying a webpage. As shown in FIG. 6, the apparatus includes: one or more processors 610 and a memory 620. The memory 620 stores one or more program units to be executed by the one or more processors 610, the one or more program units comprise: a webpage request receiving unit 601, a vector layout arranging unit 602 and a webpage transmitting unit 603.

[0064] The webpage request receiving unit 601 is adapted to receive a webpage request from a terminal, and obtain a webpage according to the webpage request.

[0065] The vector layout arranging unit 602 is adapted to arrange a vector layout for webpage elements in the webpage.

[0066] The webpage transmitting unit 603 is adapted to transmit the webpage after the vector layout is arranged, such that the terminal displays the webpage elements in the webpage according to the webpage received.

[0067] In particular, the webpage request receiving unit 601 may obtain the webpage from a third party website or from a cache of the server itself.

[0068] The rendering attribute information of the webpage element includes at least one of: a position of the webpage element layout packet in the webpage, width of the webpage element layout packet, background color of the webpage element layout packet,

height of the webpage element layout packet, and a position of a webpage element in the webpage element layout packet.

[0069] If the webpage element includes text, the rendering attribute information may further include at least one of: font size, font style, font color, and a hyperlink in the text.

[0070] If the webpage element includes a picture, the rendering attribute information of the webpage element may further include a link or a replacement text if the picture is not available.

[0071] If the webpage element includes a controller, the rendering attribute information of the webpage element further includes a controller type. The controller may be any one of the following: icon controller, list box controller, single-line text/password inputting box controller, multi-line text inputting box controller, file upload controller, drawer controller, single selection controller, or multi-selection controller.

[0072] The webpage displaying method and apparatus provided by the examples of the present disclosure may be implemented by various ways. For example, the webpage displaying method may be implemented as a plug-in program installed in the terminal or as an application which can be downloaded by the user. If the method is implemented as the plug-in program, any one of the following plug-in format may be selected: ocx, dll, cab, flash plug-in, RealPlayer plug-in, MMS plug-in, MIDI plug-in, ActiveX plug-in.

[0073] In view of the above, in examples of the present disclosure, the server receives a webpage request from the terminal, obtains a webpage according to the webpage request, arranges a vector layout for webpage elements in the webpage and transmits the webpage whose layout is arranged to the terminal. Thus, after receiving the webpage whose layout is arranged, the terminal can zoom in/out the webpage elements in the webpage according to a webpage zooming instruction. When user's fingers operate on a multi-touch screen, the webpage zooming instruction may be generated according to the operation of the user's fingers. According to the webpage zooming instruction, the terminal zooms in/out the webpage after the vector layout arrangement following a proportion and renders the webpage in real-time, so as to achieve a vector zooming effect. Thus, zooming of the webpage in the browser of the terminal is realized.

[0074] What has been described and illustrated herein is a preferred example of the disclosure along with some of its variations. The terms, descriptions and figures used herein are set forth by way of illustration only and are not meant as limitations. Many variations are possible within the spirit and scope of the disclosure, which is intended to be defined by the following claims -- and their equivalents -- in which all terms are meant in their broadest reasonable sense unless otherwise indicated.

CLAIMS

1. A method for displaying a webpage, comprising:
receiving, by a server, a webpage request from a terminal;
obtaining, by the server, a webpage according to the webpage request;
arranging, by the server, a vector layout for webpage elements in the webpage; and
transmitting, by the server, the webpage after the vector layout arrangement to the terminal, such that the terminal displays the webpage and zooms in or zooms out the webpage elements in the webpage according to a webpage zooming instruction.

2. The method of claim 1, wherein:
the obtaining the webpage according to the webpage request comprises:
obtaining, by the server, the webpage from a third party website according to the webpage request; or
obtaining, by the server, the webpage from a cache of the server according to the webpage request.

3. The method of claim 1, wherein:
the arranging the vector layout of the webpage elements in the webpage comprises:
retrieving, by the server, the webpage elements in the webpage, configuring rendering attribute information for each webpage element, and encapsulating the webpage element and its rendering attribute information into a webpage element layout packet, such that when the terminal displays the webpage, the terminal parses the webpage element layout packet to obtain the webpage element and the rendering attribute information and renders the webpage element layout packet and the webpage element according to the rendering attribute information.

4. The method of claim 3, wherein the rendering attribute information of the webpage element comprises at least one of:
a position of the webpage element layout packet in the webpage;
width of the webpage element layout packet;
background color of the webpage element layout packet;
height of the webpage element layout packet; and
a position of the webpage element in the webpage element layout packet.

5. The method of claim 4, wherein the webpage element is text; the rendering attribute information of the webpage element further comprises any one of:
font size;

font style;
font color; and
hyperlink in the text.

6. The method of claim 4, wherein the webpage element is a picture; the rendering attribute information of the webpage element further comprises a link for the picture or default replacement text if the picture is unavailable.

7. The method of claim 4, wherein the webpage element is a controller; the rendering attribute information of the webpage element further comprises a controller type; the controller comprises at least one of:

- an icon controller;
- a list box controller;
- a single-line text/password inputting box controller;
- a multi-line text inputting box controller;
- a file uploading controller;
- a drawer controller;
- a single selection controller; and
- a multi-selection controller.

8. The method of any one of claims 1 to 7, further comprising:
detecting, by the terminal, a webpage zooming instruction;
determining, by the terminal, a webpage zooming proportion according to the webpage zooming instruction; and
performing, by the terminal, a vector zooming in or zooming out operation to the webpage element layout packet and the webpage elements in the webpage according to the webpage zooming proportion; wherein the webpage element layout packet is configured as invisible.

9. An apparatus for executing plot instructions for displaying a webpage, comprising:
one or more processors;
a memory; and
one or more program modules stored in the memory and to be executed by the one or more processors, the one or more program units comprise:
a webpage request receiving unit, adapted to receive a webpage request from a terminal and obtain a webpage according to the webpage request;
a vector layout arranging unit, adapted to arrange a vector layout for webpage elements in the webpage; and

a webpage transmitting unit, adapted to transmit the webpage after the vector layout arrangement to the terminal, such that the terminal displays the webpage and zooms in or zooms out the webpage elements in the webpage according to a webpage zooming instruction.

10. The apparatus of claim 9, wherein:

The webpage request receiving unit is further adapted to obtain the webpage from a third party website or from a cache of the apparatus according to the webpage request.

11. The apparatus of claim 9, wherein:

the vector layout arranging unit is further adapted to retrieve the webpage elements in the webpage, configure rendering attribute information for each webpage element and encapsulate the webpage element and its rendering attribute information into a webpage element layout packet, such that when the terminal displays the webpage, the terminal parses the webpage element layout packet to obtain the webpage element and the rendering attribute information and renders the webpage element layout packet and the webpage element according to the rendering attribute information.

12. The apparatus of claim 11, wherein the rendering attribute information of the webpage element comprises at least one of:

- a position of the webpage element layout packet in the webpage;
- width of the webpage element layout packet;
- background color of the webpage element layout packet;
- height of the webpage element layout packet; and
- a position of the webpage element in the webpage element layout packet.

13. The apparatus of claim 12, wherein the webpage element is text; the rendering attribute information of the webpage element further comprises any one of:

- font size;
- font style;
- font color; and
- hyperlink in the text.

14. The apparatus of claim 12, wherein the webpage element is a picture; the rendering attribute information of the webpage element further comprises a link for the picture or default replacement text if the picture is unavailable.

15. The apparatus of claim 12, wherein the webpage element is a controller; the

rendering attribute information of the webpage element further comprises a controller type;
the controller comprises at least one of:

- an icon controller;
- a list box controller;
- a single-line text/password inputting box controller;
- a multi-line text inputting box controller;
- a file uploading controller;
- a drawer controller;
- a single selection controller; and
- a multi-selection controller.

16. A non-transitory computer-readable storage medium comprising a set of instructions for displaying a webpage, the set of instructions to direct at least one processor to perform acts of:

- receiving a webpage request from a terminal;
- obtaining a webpage according to the webpage request;
- arranging a vector layout for webpage elements in the webpage; and
- transmitting the webpage after the vector layout arrangement to the terminal, such that the terminal displays the webpage and zooms in or zooms out the webpage elements in the webpage according to a webpage zooming instruction.

17. The non-transitory computer-readable storage medium of claim 16, wherein:
the arranging the vector layout of the webpage elements in the webpage comprises:

- retrieving the webpage elements in the webpage, configuring rendering attribute information for each webpage element, and encapsulating the webpage element and its rendering attribute information into a webpage element layout packet, such that when the terminal displays the webpage, the terminal parses the webpage element layout packet to obtain the webpage element and the rendering attribute information and renders the webpage element layout packet and the webpage element according to the rendering attribute information.

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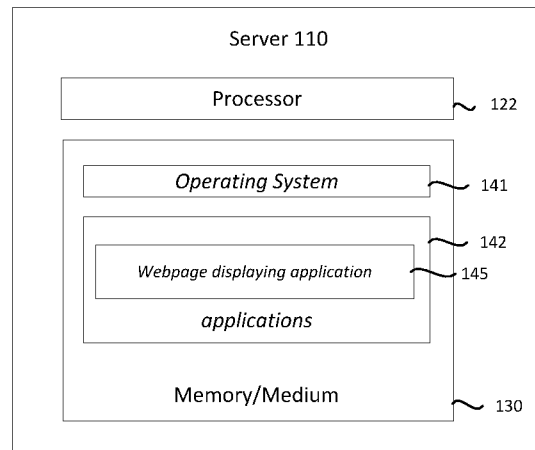
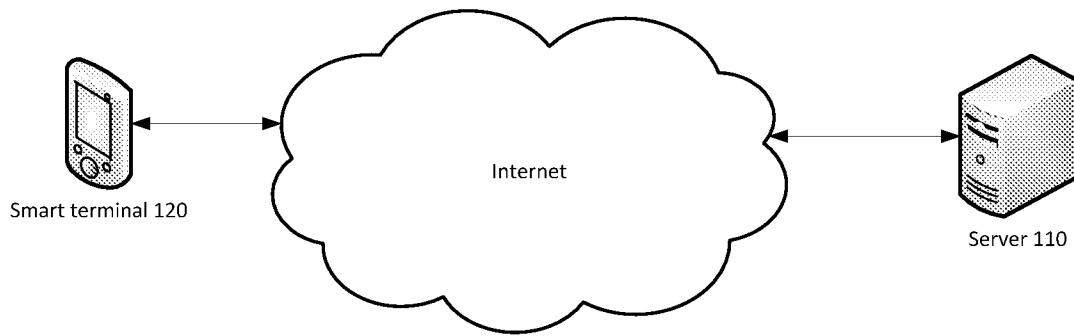


FIG. 1

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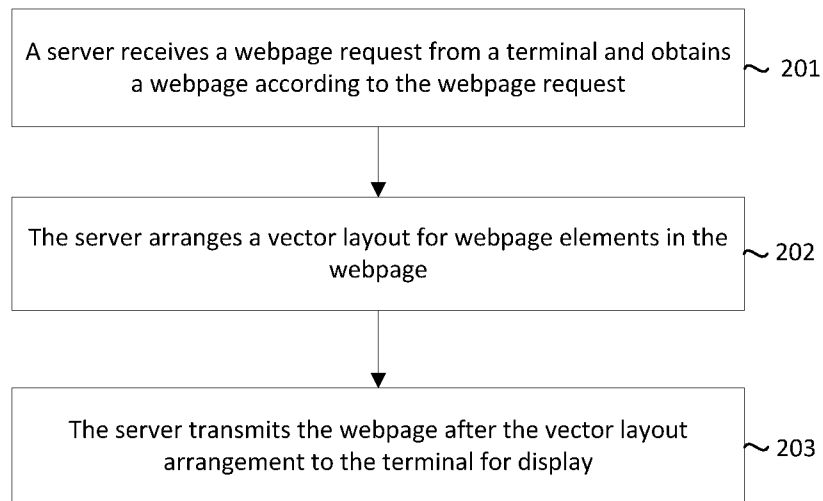


FIG. 2

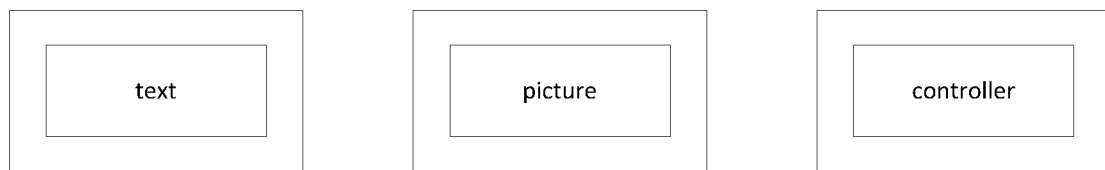


FIG. 3

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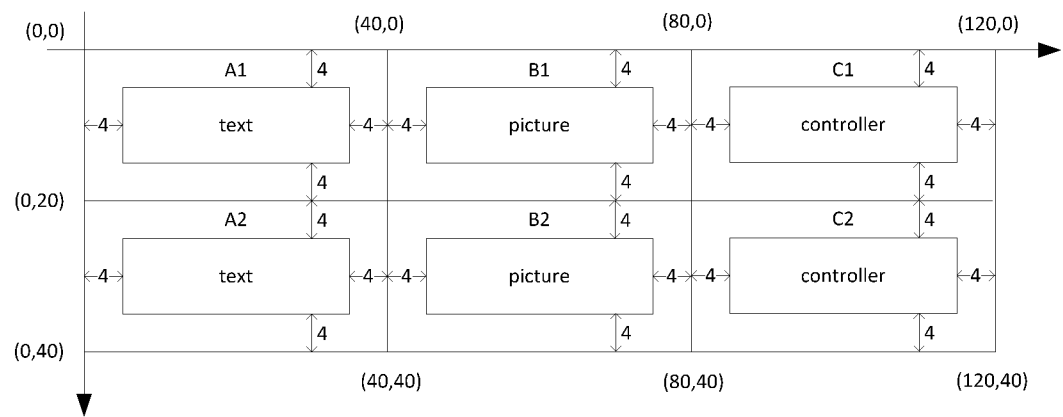


FIG. 4

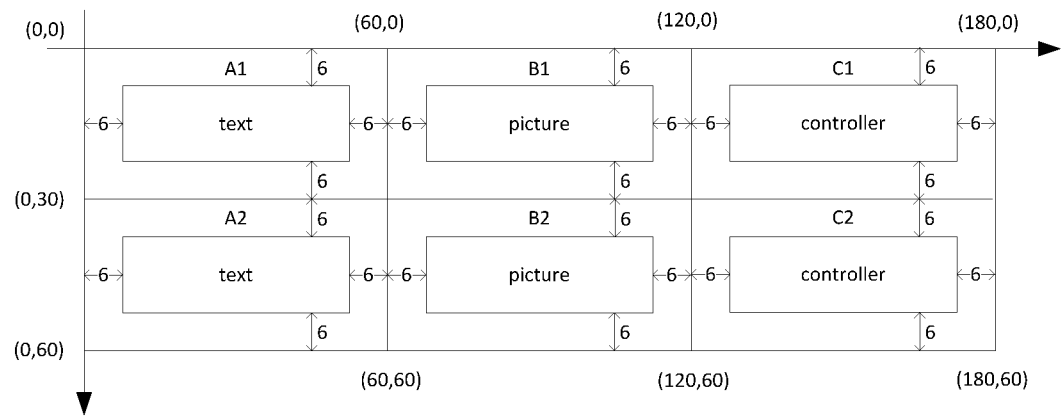


FIG. 5

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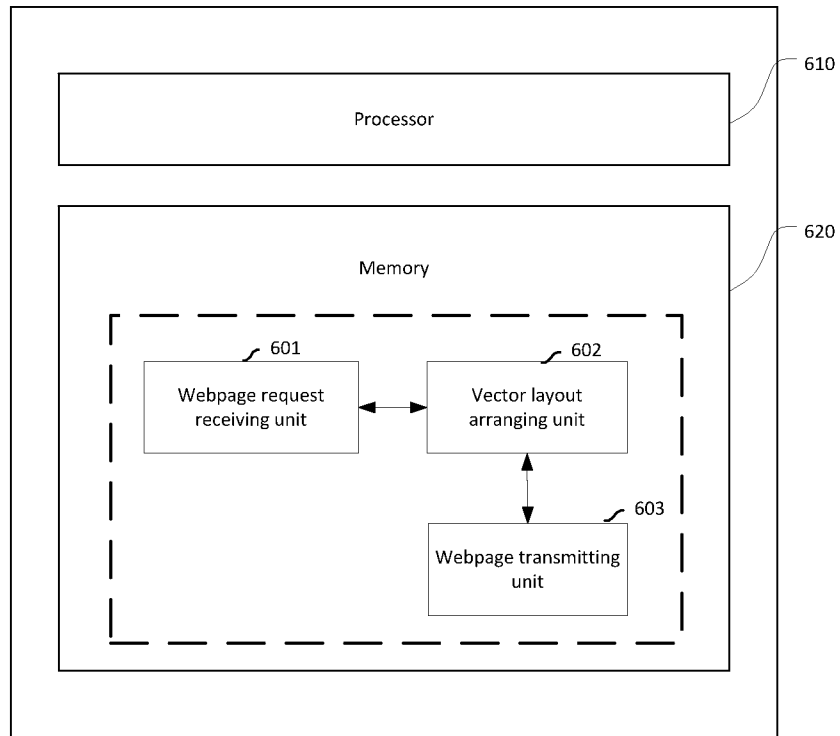


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2013/088133

A. CLASSIFICATION OF SUBJECT MATTER

G06F 17/30 (2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: G06F 17/-

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

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

DWPI, SIPOABS, CPDABS, CNABS, CNKI

webpage, display+, vector, layout, terminal, client, server, zoom+, scal+, element, attribute, packet, package

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 101882055 A (ZTE CORP) 10 November 2010 (10.11.2010) description paragraphs 33-56	1-17
A	CN 102156934 A (TAIWAN MOBILE CO LTD) 17 August 2011 (17.08.2011) the whole document	1-17
A	CN 102457528 A (UNIV BEIJING POSTS & TELECOMM) 16 May 2012 (16.05.2012) the whole document	1-17

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

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Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer LI, Yandong Telephone No. (86-10)62411735

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