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1	Non Patent Literature	Doc03-MichalsonDecl_IPR15-1434-Pat343-Image-Part1.pdf	21736815 07e7c2bc559e51bd4483ed72794a834ed5f850bf	no	90

2	Non Patent Literature	Doc03-MichalsonDecl_IPR15-1434-Pat343-Image-Part2.pdf	10586890 e552b1506d980df8df60aa1461b84af8086f9477	no	42
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3	Non Patent Literature	Doc04-MichalsonDecl_IPR15-1435-Pat506-Image-Part1.pdf	22761994 9024684e855dbb6a56aa0c20dc2a976474dd84cf	no	90
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4	Non Patent Literature	Doc04-MichalsonDecl_IPR15-1435-Pat506-Image-Part2.pdf	10521129 ad8a60c7149bdd4c2e64e0158f249e64c5b1d184	no	40
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(54) **NETWORK IMAGE VIEW SERVER USING EFFICIENT CLIENT-SERVER, TILING AND CACHING ARCHITECTURE**

BILDBETRACHTUNGS-NETZWERKSERVER MIT EFFIZIENTEN KUNDENSERVER, DATENSEITEN UND CACHEARCHITEKTUR

SERVEUR DE VISUALISATION D'IMAGES EN RESEAU UTILISANT UN SERVEUR CLIENT EFFICACE, UNE ARCHITECTURE EN MOSAIQUE ET A CONCEPT D'ANTEMEMOIRE

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(56) References cited:

EP-A- 0 967 556	**US-A- 5 555 101**
US-A- 5 615 325	**US-A- 5 666 490**
US-A- 5 701 451	**US-A- 5 708 825**
US-A- 5 740 425	**US-A- 5 745 109**

- **MEYER E A ET AL: "Borealis Image Server" COMPUTER NETWORKS AND ISDN SYSTEMS, NORTH HOLLAND PUBLISHING. AMSTERDAM, NL, vol. 28, no. 11, May 1996 (1996-05), pages 1123-1137, XP004018214 ISSN: 0169-7552**
- **CURRY C: "Making A Clickable Image Map" N.A., May 1995 (1995-05), XP002235112**
- **"VIRTUAL IMAGE EDITING" IBM TECHNICAL DISCLOSURE BULLETIN, IBM CORP. NEW YORK, US, vol. 39, no. 8, August 1996 (1996-08), pages 93-96, XP000638148 ISSN: 0018-8689**

EP 1 070 290 B1

Description

1. Field of the Invention

[0001] This invention relates to workstation viewing images of digital documents stored on a network server and in particular to viewing large digital document images using a client-server architecture.

2. Description of the Prior Art

[0002] Current methods for viewing digital document images for workstations in a networked environment use proprietary workstation application software to access a network image file server. To view an image, the application software transfers a copy of the whole image file from the image file server to the networked client workstation This method has a number limitations including: inefficient use of the network; high software purchase cost per workstation; high software administrative cost per workstation; high computational demands on the workstation; proprietary software available only for limited workstation types. Some other network image viewers may provide viewing using more optimized image transmission protocols but only with proprietary protocols and proprietary workstation software.

[0003] CURRY C: "Making A Clickable Image Map" N.A., May 1995 (1995-05), XP002235112 presents a way to use a visual directory as a means for accessing underlying files or documents or images that relate to a place on the top level visual directory. The user is required to create a file that links areas on the initial image to the underlying files or documents. A clickable image map allows a user to click on any location of a graphic and receive more information in the form of an enlarged picture or a link to a uniform resource locator (URL). However, this prior art reference fails to disclose a grid of view tiles.

[0004] PERRY, H.: "Spaces between tiled gifs", retrieved from the internet: URL:http://groups.google.com/groups/ comp.infosystems.www.authoring.images/browse_thread/23b0ac047 b8740e8/6cfcf0bc11b29e0b, 18 March 1997 discusses the so-called tiling of graphics files.

[0005] Further, the tiling of graphics files is also discussed in PERRY, H.: "Spaces between tiled gifs", retrieved from the internet: URL:http://groups.google.com/group/ comp.infosystems.www.authoring.images/msg/c651277ebbf96807?hl =en&dmode=source, 18 March 1997.

[0006] RABINOVICH B. et al.: "Visualization of Large Terrains in Resource-Limited Computing Environments", Proceedings Visualization '97, 24 October 1997 discloses a software system supporting interactive visualisation of large terrains in an environment comprising a low-end client computer accessing a large terrain database server through a low-bandwidth network. The large terrain scene is stored on disk in the form of geometry information and texture tiles of fixed size. A low-end client computer loads only those texture tiles of the appropriate resolution which intersect the view footprint, if they are not yet loaded.

[0007] POTMESIL M.: "Maps Alive: viewing geospatial information on the WWW", Computer Networks and ISDN Systems 29 (1997) 1327-1342 discloses a WWW-based system for viewing geospatial information. The system comprises a 2D map browser capable of continuous scroll and zoom of an arbitrarily large sheet, which downloads and caches geographical information, geometrical models and URL anchors in small regions called tiles.

[0008] MEYER E. et al.: "Borealis Image Server" (COMPUTER NETWORKS AND ISDN SYSTEMS, NORTH HOLLAND PUBLISHING. AMSTERDAM, NL, vol. 28, no. 11, May 1996 (1996-05), pages 1123-1137, XP004018214 ISSN: 0169-7552,) discloses an image server for serving watermarked images to client web browsers. The server is programmed with web server software. The server receives requests from a client web browser in the form of an URL encoding an image name, output style such as thumb nail or full size, and optionally a graphic format. Upon receipt of a request, the server loads the file into memory, processes it, and delivers the resulting image to the browser. One of the output styles supported by the image server is the "info" output style. When an image is requested with output style "info", HTML code is returned to the browser defining a full HTML page consisting of the title of the image, an inlined thumbnail of the image which is a link to the full-sized image, and copyright and author/title information. However, the URL does not specify a view of the image file in terms of scale and region. Further, it is not disclosed that the web server determines an array of view tiles that corresponds to the requested view and creates the view tile images. Finally, it is not disclosed that the web server creates an HTML output file including appropriate formatting and references to the created view tile images.

[0009] Therefore, the system as disclosed in "Borealis Image Server" is not sufficiently efficient, which is especially important for viewing large images, i.e. images that cannot be displayed in full.

[0010] Therefore, it is an object of the invention to adapt the systems as disclosed in "Borealis Image Server" to allow efficient viewing of large images.

SUMMARY OF THE INVENTION

[0011] This object is achieved by a computer network server according to claim 1.

[0012] The invention comprises a computer network server adapted to store digital document image files, programmed to receive requests from a client Web browser in URL code, the URL specifying a view which identifies an image file and format, to compose the requested view, and to transmit HTML code for the resultant view to the client Web browser to display.

[0013] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention and together with the general description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

FIG. 1 is a diagram of the system architecture showing the relationship of the components of the system and the image view server.

FIG. 2 is a flow diagram of the steps performed by the system to request, compose and display a view of an image.

FIGS. 3A and 3B are diagrams that show the view tile grid as determined by the view scale.

FIGS. 4A and 4B are diagrams that show the grid view tiles composed for an initial image viewS and then for a shifted view of the image.

FIGS. 5A and 5B are diagrams that show the web browser display of view tiles for an initial view and then for a shifted view of the image that correspond to FIGS. 4A and 4B.

FIGS. 6A and 6B are diagrams that show view tiles pre-computed by the background view composer.

FIG. 7 is a high-level flow diagram of the foreground view composer.

FIG. 8 is a flow diagram for the view generator component of the view composer.

FIG. 9 is a flow diagram for the data output component of the view composer.

FIGS. 10A, 10B, and 10C together constitute a flow diagram for the view tile cache garbage collector.

DETAILED DESCRIPTION OF THE INVENTION AND THE PREFERRED EMBODIMENTS

[0015] References will now be made in detail to the presently preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings.

The preferred embodiment is a server PC consisting of an Intel Pentium Pro 200MHz processor, with at least 128MB of RAM, an Ultra-wide Fast SCSI disk controller with at least 4GB of hard disk space, and LAN/WAN/Internet network interface controllers. The server runs the Windows NT Server Version 4 operating system with NT File System, Microsoft Internet Information Server Version 3, and the network image server software. The server and client are configured with TCP/IP network protocols to support the HTTP (Web) protocol. No software other than a Web browser is required on the client. The preferred Web browser is Internet Explorer 3.0 or Netscape 3.0 or higher.

Referring first to FIG. 1, a network comprising client workstations 10 and 20 are connected through network connections to a network image view server 100 comprising a network server interface, preferably a web server 30 which uses the Hypertext Transfer Protocol (HTTP), a request broker 40, a foreground view composer 50, a view tile cache 60, a background view composer 80, a garbage collector 70, and a document repository 90 having image files.

The network image view server, i.e., client workstation, or "workstation," 100 can be implemented on a computer, for example a personal computer configured with a processor, I/O, memory, disk storage, and a network interface. The network image view server 100 is configured with a network server operating system and Web server software 30 to provide the network HTTP protocol link with the client workstations 10 and 20. Typical networks include many workstations served by one, and sometimes more than one, network server, the server functioning as a library to maintain files which can be accessed by the workstations.

In operation according to an embodiment of the method of the invention, using the Web browser software on the client workstation, a user requests an image view 110 (FIG. 2) having a scale and region specified by means of a specially formatted Uniformed Resource Locator (URL) code using HTTP language which the Web server can decode as a request to be passed to the image view composition software and that identifies the image file to be viewed, the scale of the view and the region of the image to view. The network image server sends HTML data to the client with pre-computed hyperlinks, such that following a hyperlink by clicking on an area of an image will send a specific request to the server to deliver a different area of the drawing or to change the resolution of the image. The resultant HTML from this request will also contain pre-computed hyperlinks for other options the user may exercise.

The code is sent over the network to the network server where the web server software interprets the request 120, passes the view request URL to the foreground view composer software through a common gateway interface (CGI) that is designed to allow processing of HTTP requests external to the Web server software, and thereby instructs the request broker 130 to get the particular requested view, having the scale and region called for by the URL.

The foreground view composer is initialized 140 and composes the requested view 150 after recovering it from memory on the network server. The foreground view composer software interprets the view request, computes which view tiles are needed for the view, creates the view tiles 160 needed for the view, and then creates Hypertext Markup Language (HTML) output file to describe the view composition to the Web browser, unless the necessary view tiles to fulfill the request are already computed and stored in cache memory of the workstation, in which case the already-computed tiles are recovered by the Web browser. In either case, the foreground view composer formats the output 170 and then initiai-

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