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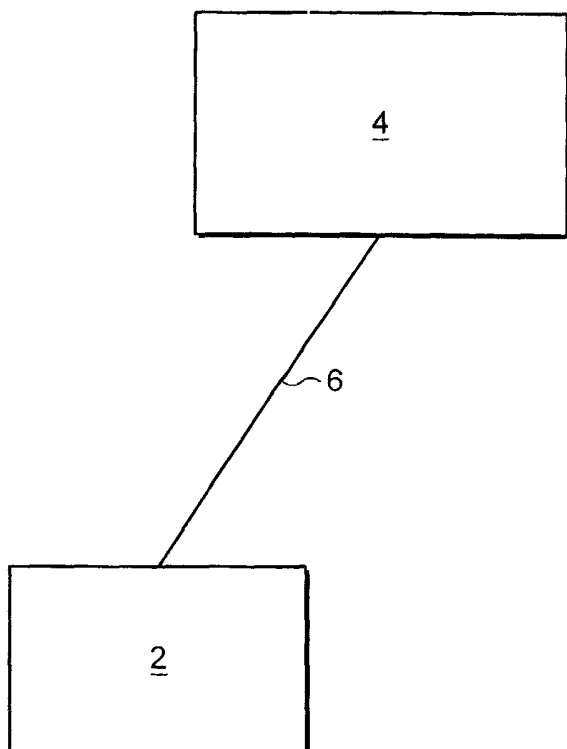
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(54) Title: DATA RETRIEVAL



(57) Abstract: A system for controlled access to data which consists of images and text is provided for use over a network connection such as the internet. In the scheme of the present invention a data set initially downloaded by the user consists of primary and secondary images that represent a complex object such as an anatomical image of part of the body incorporating a large number of structures; a data table containing date data as well as an entry for each structure identified in the image. The secondary image is invisible to the user but identifies each structure within the primary image as a coterminous area of a flat colour that serves to provide in its RGB data for the colour address data for that structure. The data set initially downloaded also contains an applet that extracts from the primary and secondary images a data address for the anatomical structure the underlying the part of the image which the user has clicked on. The data table containing the data addresses also contains a date of downloading and is encrypted. The applet compares the encrypted data with the user system date and will only function if the download is current.

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Data Retrieval

Background of the Invention

The present invention relates to a data retrieval system and more particularly to interactive computer systems which permit the display of images and data stored on a server on a remote terminal of a user. The remote terminal may be connected to the
5 server via an internet connection or other form of network.

Traditionally web pages are downloaded from a server in response to user commands. These pages may also contain programmes or applets which run on the remote terminal of the user in order to cause changes in the displayed page without further
10 accesses to the server.

Where the data contained in the pages downloaded from the server is of value, a user may be required to pay for access to that data. One form of payment is to license use of the data for a specific period of time. Since a copy of the downloaded data is stored on the remote terminal of the user, there is a technical problem in controlling use once
15 the data has been downloaded. It is necessary to provide some scheme to monitor the date of the downloaded file and the corresponding expiry of the licence.

The present invention is particularly concerned with the display of anatomical data although it will be appreciated that the system described would be equally applicable to other complex image data. For the purposes of this description, however, reference
20 will be made to anatomical data by way of example. Anatomical images contain a large number of specific structures. Identifying and labelling the structures within a particular image is challenging but is essential to the understanding of the image. For example the structures within an image of a hand include each of the bones, muscles, blood vessels, ligaments etc. In any given image a different part of the structure may
25 be visible.

Prior Art

GB-A-2346786 (IBM) addresses the problem of highlighting a structure within an

image - in this case the geographical region of a country within a map- in response to user interaction with the image. It is also taught to display further information such as a list of wines for sale specific to the region. IBM does not address the problem of controlling use after download.

5 Solution of the Invention

In accordance with the present invention there is provided a data retrieval system as defined in the claims.

This system has numerous advantages to a user viewing an anatomical image. The further data can include a pattern applied over the area of the selected structure and/or
10 a text label stored in the data table. Because the data set stored locally includes the substantial files, it is easy and quick for the user to scroll over the image. In order that the anatomical data can be understood explanatory text is needed. This text is preferably part of the additional further data downloaded in response to the user interaction with the primary image. Typically the selection will be made by the user
15 clicking with his mouse on that area of the image showing the structure of interest.

While it would be possible for all of the relevant text data relating to the image to be downloaded to the remote terminal with the image, this would effectively allow the user to have complete control of that data after the internet connection to the server had been closed. Any time period licensing would be ineffective. It is therefore
20 proposed to reserve at least part of the data on the server for download in response to the user interaction with the primary image. This requires processing of the data generated by the user in response to his interaction with the image in order to determine the appropriate text data for download. In order to provide satisfactory response times it is necessary to provide an efficient system for processing that data
25 either on the user terminal or on the server. In accordance with the present invention an applet which is adapted to process user interactions with the image in order to generate a request for appropriate further data to the server is part of the initial data set downloaded onto the user terminal.

The downloaded data includes date information which is included in the data request generated by the applet to the server. If this date information is not current then the server will not respond to the request by transmitting the required data as the licence will have expired.

5 Brief Description of the Drawings

In order that the invention may be well understood an embodiment thereof will now be described, by way of example only, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 shows a diagrammatic representation indicating the relationship
10 between the elements of a data set; and

Figure 2 is a block diagram of the computer network.

A user terminal is capable of connecting to a server 4 by means of a network connection 6. Typically this connection is over the Internet.

The server stores image data and associated text data. Each individual image
15 incorporates two separate image files 10, 12 representing a primary image and a secondary simplified image of the same subject. The primary image file 10 is visible to the user when displayed on the user terminal. This visible image may be produced in JPEG format. The secondary image 12 effectively labels the first image. The secondary image is a false colour image of the same subject as depicted in the primary
20 image. It is created by identifying each structure within the primary image 10 and rendering that structure in the secondary image 12 as a flat colour area coterminous with the boundaries of the structure in the primary image 10. These are false colours as they do not relate to the appearance of the subject. The colours chosen for each structure are distinct. Any colour can be represented by distinct values of its red,
25 green and blue (RGB) components. These values can be represented as integers. The RGB components of each colour represent "address data" of that particular structure. Accordingly, when a user clicks on any point within the primary image he is also

clicking on the corresponding area of the underlying secondary image. The colour of that area of the secondary image represents a unique address which identifies the structure with which the user is interacting.

When a user requests a particular image from the server a data set is initially
5 downloaded. This data set includes primary and secondary image files.

The data set downloaded to the user's computer terminal 2 also incorporates an encrypted look-up table which contains the addresses identified by the false colour areas of the secondary image 12, the name of the associated structure and date data which will typically relate to the date on which the look-up table was downloaded.

10 In addition, the data set also includes an applet. The applet is responsible for displaying the primary image and controlling the display when the user clicks on an area of interest in the primary image.

The applet decrypts the data table and checks the date stamp. If the data on the user's system clock is not within some specified time period of the date stamp, the applet
15 will generate an error message and refuse to display the image . If the date settings are within limits, the applet will generate a label when a user clicks on the image. This label is derived by generating a cross hatch (or other pattern) over the contiguous extent of the false colour area in the secondary image. This label is combined with the primary image to show the extent of the anatomical structure selected. The applet will
20 then display the name of the selected anatomical structure. In addition the applet may send a request to the server for the complete anatomical notes on that structure.

Claims

1. A data retrieval system for enabling a user to display further data relating to a selected portion of a displayed image comprising:
- 5 a) means for downloading to storage means on a user terminal in response to a user demand a data set comprising
- i. a primary image showing detail of a plurality of specific structures;
- ii. an encrypted data table containing a date stamp and an entry for each structure including further data for that structure ; and
- 10 iii. an applet;
- b) means for displaying the primary image;
- c) means enabling a user to select a structure by interaction with the primary image;
- 15 d) means controlled by the applet for displaying further data together with the primary image;
- e) means controlled by the applet for generating a message containing said date stamp for transmission to the server requesting the download of additional relevant further data.
- 20 2. A data retrieval system for enabling a user to display further data relating to a selected portion of a displayed image comprising:
- a) means for downloading to storage means on a user terminal in response to a user demand a data set comprising

- 5
- i. a primary image showing detail of a plurality of specific structures;
 - ii. a corresponding secondary image in which each specific structure within the primary image is identified by a coterminous area of a flat colour unique to that structure;
 - iii. an encrypted data table containing a date stamp and an entry for each structure including at least the flat colour of that structure ; and
- 10
- iv. an applet;
- b) means for displaying the primary image;
- c) means enabling a user to select a structure by interaction with the primary image;
- 15
- d) means controlled by the applet for extracting the corresponding colour from the secondary image;
- e) means controlled by the applet for identifying the corresponding entry in the data table;
- f) means controlled by the applet for displaying further data together with the primary image; and
- 20
- g) means controlled by the applet for generating a message containing said date stamp for transmission to the server requesting the download of additional relevant further data.

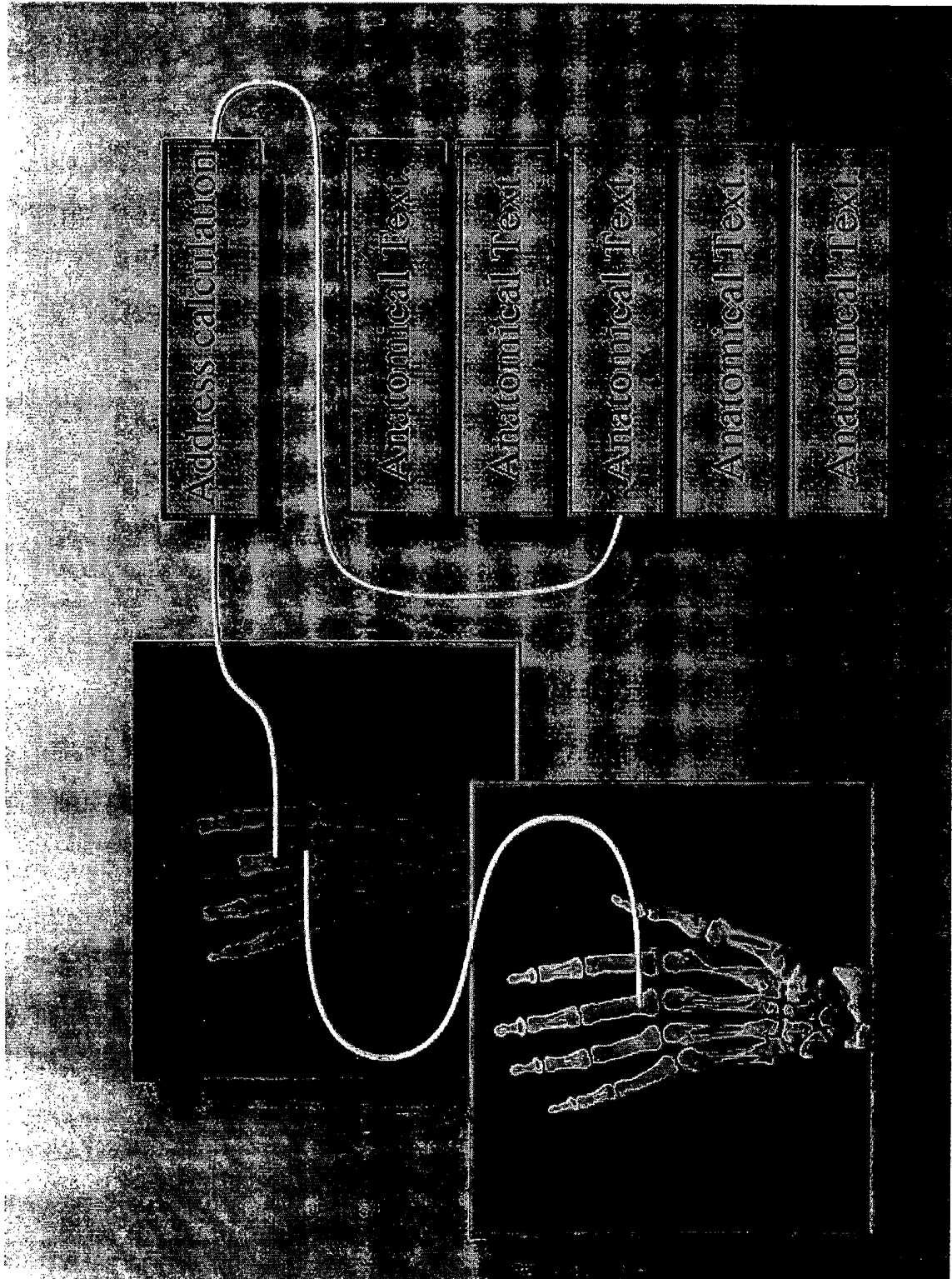


FIG. 1

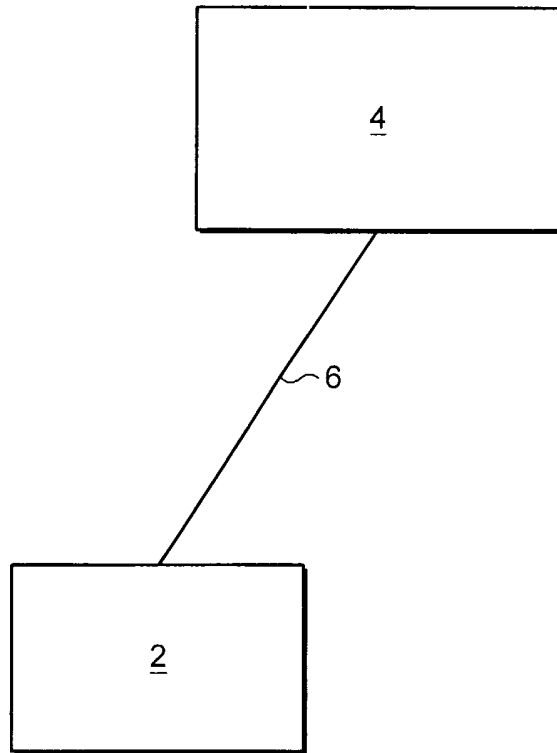


FIG. 2