(54) Titre : VISUALISATION D'ENSEMBLES DE DONNEES 3D MULTIPLATEFORME ET SPECIFIQUE AUX DONNEES
(54) Title: CROSS-PLATFORM AND DATA-SPECIFIC VISUALISATION OF 3D DATA RECORDS
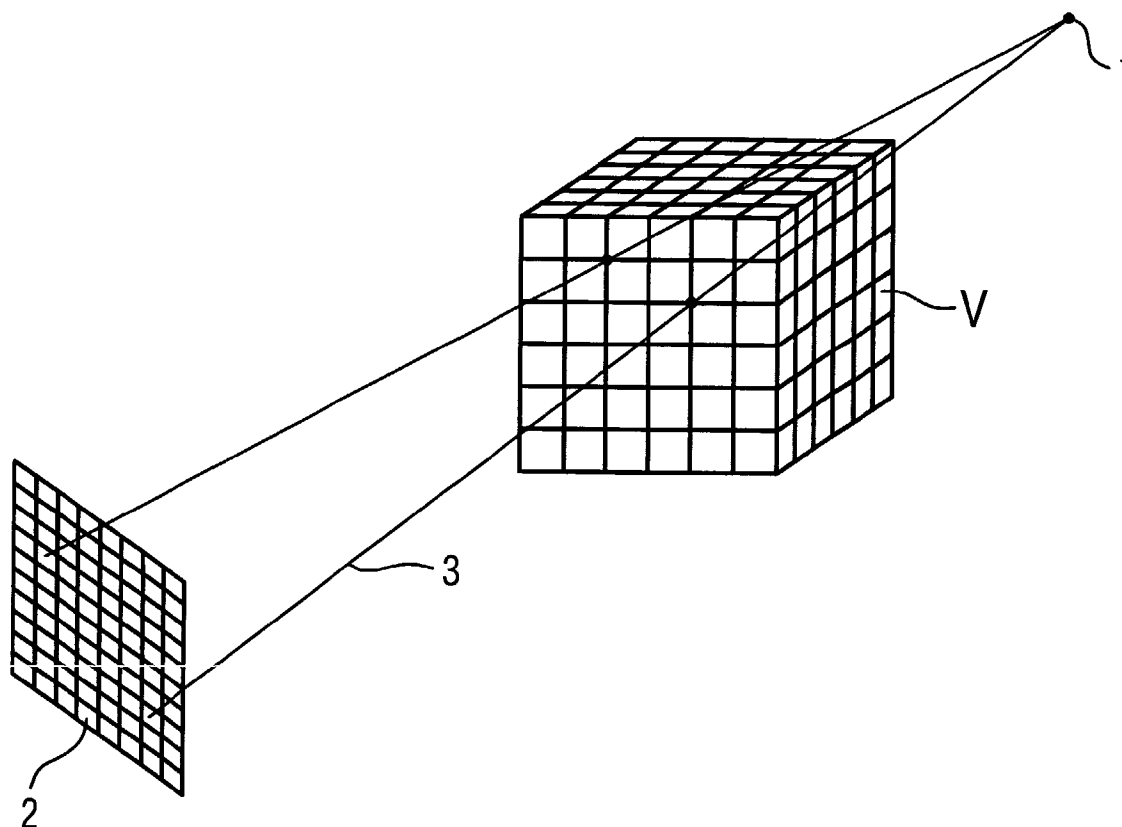
(57) Abrégé/Abstract:
The invention relates to a device for the cross-platform and data-specific visualisation of 3D data records by means of a visualisation software for representation on a 2D monitor. The 3D volume data is stored together on a data carrier with a visualisation software and is transmitted to a user for playing back on any PC.

ABSTRACT

The invention relates to a device for the cross-platform and data-specific visualisation of 3D data records by means of a visualisation software for representation on a 2D monitor. The 3D volume data is stored together on a data carrier with a visualisation software and is transmitted to a user for playing back on any PC.

Description

Cross-platform and data-specific visualization of 3D
data records

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The invention relates to a device for cross-platform
and data-specific visualization of 3D data records by
means of visualization software for display on a 2D
monitor.

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The brochure entitled "SIENET MagicView 300, Image
Reporting, Image Processing and All That Goes With It"
describes a viewer for visualizing 2D data records, as
may be gathered from the first column on page 2. It is
15   stated there that a digital image is defined as a
matrix of discrete values that represent the gray-scale
values. However, a matrix is always two-dimensional and
does not represent a data volume such as is supplied,
for example, as a 3D data record from the CT, MR or C-
20   arm CT.

Migration of 2D recordings to 3D volume data records
leads to up the problem of having to exchange the
volume data among doctors and of having to visualize
25   them on different computers. In order to ensure uniform
image quality, in addition to the medical data record
it is necessary to make available a program that
permits the visualization of the 3D data on the 2D
monitor. The use of different methods for volume
30   visualization together with the many possibilities for
parameterizing the algorithms lead to a different image
quality.

To date, such volume data have mostly been exchanged by
35   transmitting the volume data record via a DICOM
interface to a medical workstation at which expensive
volume visualization software is installed, although
difficulties can occur in turn here as well when this

volume visualization

software is not the same as that which was used on the
original computer of the radiologist.

In addition, individual views of the volume data record
5   have also been generated, stored in a standard image
format and passed on. Images can be viewed on any
desired PC with the aid of standard programs such as
photoshop, for example. Finally, it has also already
been proposed to store a number of fixed views in a set
10 sequence as a digital video (avi, for example) and then
play them back using standard software tools.

It is therefore the object of the invention to provide
a   device   for   cross-platform,   data-specific
15 visualization of 3D data records which, in conjunction
with a simple design, operates independently of the
computers respectively used and of any possible
visualization software, and thereby permits 3D volume
data records to be ordered and viewed by any desired
20 third parties with the best play back quality.

To achieve this object, the invention provides that the
3D volume data are stored together with visualization
software on a data carrier, and the latter is
25 transmitted to a user for play back on any desired PC.

Storing the 3D volume data record together with any
(desired) visualization software means that 3D volume
can be visualized on any PC without software
30 additionally installed on said PC. Moreover, the unit
of data record and visualization algorithm ensures that
no general visualization tool with the aid of which any
desired data records can be displayed is involved.

35 It can be provided here in a development of the
invention that the visualization parameters are also
stored on the data carrier in an

at least partially unchangeable fashion. This yields
the advantageous possibility of, for example, making a
3D volume data record, produced by a radiologist and in
which specific structures have been specially
5   emphasized by specific visualization parameters,
available to the operator in the operation room, in
which case the latter then also sees precisely the
structures that the radiologist has emphasized via the
visualization parameters on the basis of his specialist
10   knowledge. In many cases, it can be expedient precisely
when transmitting such 3D data to less experienced
doctors not to leave to the latter all the
possibilities of selecting the various visualization
parameters, since in most cases they are thereby
15   completely overtaxed and, in the final analysis, are
unable to extract any useful image at all from the
data. Storing the 3D volume with visualization software
and the visualization parameters found by the
radiologist to be the best possible display of a
20   specific structure on a data carrier, preferably a CD,
renders it possible in a simple way to solve the
problem of passing on such 3D volume data records among
doctors in such a way that passing them on is very
simple, that the receiver requires no special
25   facilities (expensive visualization software on his
work station), and that the data of the 3D volume data
record that are of interest to the receiver can be
passed on such that even a non-radiologist obtains an
optimum display. Of course, even in such a case with
30   fixed visualization parameters the operator still has
the options of spatially rotating the 3D volume data
record, for example with specially emphasized bone
structures or else arborizations, and of regarding them
from all possible points of view in order to prepare
35   the operation.

Further advantages, features and details of the

invention emerge from the following description of an exemplary embodiment and with the aid of the drawing, which shows

schematically the projection of a 3D volume data record onto a 2D monitor.

When a 3D volume data record is being produced, the
5 volume of interest is transirradiated from an optical center 1, and the points lying on the line of transirradiation are imaged in an image plane. A 3D volume data record can be calculated with the aid of an algorithm from a number of two-dimensional images
10 produced from different optical centers 1. In the reconstruction, shown in the figure, of the 3D data record on a 2D monitor 2, the points lying on a projection ray 3 are added to the 3D volume V in accordance with variable points of view, specifically
15 the so-called visualization parameters, for example with their gray-scale values, and imaged on the 2D monitor 2 as a pixel. The setting of the visualization parameters is a particularly difficult art in this case and is mastered only by experienced radiologists,
20 whereas normal doctors are able only with great difficulty to emphasize the structures they desire from a 3D volume data record. For example, depending on the setting of the visualization parameters, vascular arborizations in the 3D volume V, for example, are
25 specially emphasized, or else specific bone structures or other medical details. If these visualization parameters are recorded in common on a data record together with the visualization software respectively used and the 3D volume data by the recording
30 radiologist, in particular burnt onto a CD, this data record can very easily be sent to a doctor or another department of a hospital where a simple PC requiring no special visualization installations of any sort, that is to say, in particular, on which there is no need to
35 install any expensive visualization software, is sufficient for visualization. The simultaneous co-storage of the visualization parameters as far as

possible in a way such that the receiver is no longer capable of changing them has the advantage that even less experienced doctors can view on their simple PC with the best image quality precisely the structures
5 emphasized by the radiologist.

An exemplary scenario could look as follows in this case:

A neuroradiologist generates a three-dimensional volume data record with the aid of an angiography unit, edits the volume in such a way that an aneurism is effectively displayed, and burns a CD for the neurosurgeon. The latter takes the CD, plays it on a standard PC and can visualize and analyze the 3D data record directly. He is not dependent on a special work station, can inspect the data record on any desired computer, and can do so, moreover, with the same quality as his colleague in neuroradiology.

Patent Claims

1.   A device for cross-platform and data-specific
visualization of 3D data records by means of
5   visualization software for display on a 2D monitor,
characterized in that the 3D volume data are stored
together with visualization software on a data carrier,
and the latter is transmitted to a user for play back
on any desired PC.
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2.   The device as claimed in claim 1, characterized in
that the visualization parameters are also stored on
the data carrier in an at least partially unchangeable
fashion.
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3.   The device as claimed in claim 2, characterized in
that the data carrier is a CD.

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