Case Number: T 0938/96 - 3.5.1
Application Number: 87305835.8
Publication Number: 0258976
IPC: H04N 1/393
Language of the proceedings: EN

Title of invention: An image viewing station for picture archiving & communications systems

Patentee: THE UNIVERSITY OF ARIZONA

Opponent: Koninklijke Philips Electronics N.V.

Headword: Image viewing station/THE UNIVERSITY OF ARIZONA

Relevant legal provisions: EPC Art. 100(a), 56

Keyword: "Inventive step (no)"

Decisions cited: -

Catchword: -
Case Number: T 0938/96 - 3.5.1

DECISION
of the Technical Board of Appeal 3.5.1
of 4 July 2000

Appellant: THE UNIVERSITY OF ARIZONA
(Vice President for Research Administration 601
Tucson
Arizona 85721 (US)

Representative: Shindler, Nigel
BATCHELLOR, KIRK & CO.
102-108 Clerkenwell Road
London EC1M 5SA (GB)

Respondent: Koninklijke Philips Electronics N.V.
(Groenewoudseweg 1
NL-5621 BA Eindhoven (NL)

Representative: Schouten, Marcus Maria
INTERNATIONAAL OCTROOIBUREAU B.V.
Prof. Holstlaan 6
NL-5656 AA Eindhoven (NL)

Decision under appeal: Decision of the Opposition Division of the European Patent Office posted 16 August 1996 revoking European patent No. 0 258 976 pursuant to Article 102(1) EPC.

Composition of the Board:
Chairman: P. K. J. van den Berg
Members: R. R. K. Zimmermann
P. H. Mühlens
Summary of Facts and Submissions

I. The appeal concerns European patent No. 0 258 976 (application No. 87 305 835.8, priority date: 9 July 1986), the mention of the grant being published on 8 June 1994. The patent claim as granted was directed to an image viewing station for picture archiving and communication systems, provided for storing, processing and displaying image data produced by a plurality of modalities, each with a different dynamic range.

II. The appellant filed an opposition against the patent on 6 March 1995, invoking lack of inventive step (Article 100(a) EPC) as the only ground of opposition and requesting revocation of the patent in its entirety. In support of the opposition, the appellant cited, inter alia, the following documents:


III. The opposition division revoked the patent for the reason of lack of inventive step in a decision posted on 16 August 1996. In its view the invention differed from the closest prior art, considered to be disclosed
in document D1, only by the claimed method for interpolating image data, a method, however, which would already have been known from document D3.

IV. Against this decision the patent proprietor filed a notice of appeal on 15 October 1996, requesting complete reversal of the decision. The appeal fee was paid the same day; the grounds of appeal were subsequently filed on 20 December 1996.

In public oral proceedings held before the Board on 4 July 2000, the matters at issue were discussed with the representatives. The appellant requested that the decision under appeal be set aside and the patent maintained on the basis of the claim named "second auxiliary request - second proposal" as filed on 20 December 1996 and amended by adding the word "raw" at the end of the third line after the word "storing". The claim according to the appellant's request reads then as follows:

"An image viewing station for picture archiving and communication systems, comprising: random access base memory means (10) for storing raw image data corresponding to plural images to be displayed; image processing means (12) coupled to said base memory means for performing predetermined processing operations on said raw image data and for providing corresponding display data, said image processing means including: zooming means (106) responsive to said stored raw image data for obtaining values of estimated image data along a line between said data; display memory means (14) coupled to said image
processing means for storing the display data processed by said image data processing means;
user input means (35) for generating input signals indicative of selected images and image formats to be viewed;
display means coupled to said display memory means for displaying images based on the display signals stored in said display memory means; and
control processor means for connection through an internal bus to said base memory, image processor, and display memory means for providing the corresponding command signals responsive to said input signals from said user input means; characterised in that:
 said random access base memory means (10) stores raw image data produced by a plurality of modalities each with a different dynamic range and image data word length;
said image processing means further includes normalising means (102) for normalising said different dynamic ranges of said raw image data stored in said base memory means;
said zoom means performs a fractional bilinear interpolation between the values of said normalised raw image data so as to produce selectably continuous magnification or reduction of the image; and
means (114,116) being provided to define the length of the image data word during memory read and write operations."

The respondent requested that the appeal be dismissed.

V. Regarding the issue of inventive step, the respondent referred to document D2 as the most pertinent prior art document. The only difference distinguishing the claimed subject-matter from the system described in
document D2, the "generalized object display processor architecture GODPA", was the feature according to which the zoom means performed a fractional bilinear interpolation of the image data for zooming the image. As already pointed out in the decision under appeal, this feature was rendered obvious by document D3.

This prior art system, however, permitted the real-time display and processing of independent objects derived from medical imagery produced by CT, PET and NMR reconstruction techniques. Each one of the distinct objects were associated with an object descriptor block ODB containing the parameter "format" which defined the number of bits per voxel. Such a parameter made sense only if objects having different dynamic ranges and image data word length were stored and processed: it was in fact explicitly mentioned that the generalized object display processor architecture might support a plurality of different tone scales.

Therefore, the claimed viewing station lacked any inventive step having regard to the combination of documents D2 and document D3.

VI. The appellant agreed that document D2 represented the closest piece of prior art but rejected the view that the object memory of the generalized object display processor architecture was intended to store, simultaneously, different image data formats. The appellant observed that document D2 indicated on page 49 that "currently, the only format is eight bits/voxel gray scale data". The invention was thus distinguished from the GODP system essentially by the features ensuring that image data having different formats could be stored simultaneously in the base
memory. This rendered data conversion superfluous; the raw image data from different modalities could directly be loaded into the base memory and then repeatedly and independently processed and displayed on an image by image basis without a need to reload the raw data from the respective data source. Preprocessing was not necessary, the normalisation step could be carried out after the raw image data had been read from the base memory. The conventional workstations did not provide such a functionality.

**Reasons for the Decision**

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC and is thus admissible.

2. As to the merits of the case, the principal issue to be decided is whether the patent as amended complies with the requirement of inventive step as set out in Articles 52(1) and 56 EPC.

3. Both parties to the appeal procedure concur that the "generalized object display processor architecture GODPA", the prior art system described in document D2 primarily with reference to Figures 7 ff., comes closest to the image viewing station defined in the claim under consideration and thus forms an appropriate starting point for assessing the inventive step.

4. The "GODP system" allows for processing and viewing medical images captured from imaging devices such as CT and PET scanner as well as for interacting in real time with those images (see in particular the introductory
and closing paragraphs of document D2). The system comprises data access components (host bus, object access unit OAU, object memory bus OMB, etc.) so that it may form part of a multiprocessing environment (see page 54, section titled "Object database access"). Therefore, the GODP system is suitable to be used as an image viewing station within a picture archiving and communication system.

Furthermore, the GODP system includes random access base memory means ("object memory modules" using RAMs, see page 46, section titled "Object memory system" and page 55, first paragraph), image processing means ("density map", "arithmetic processors", "buffer memories", etc.), zooming means ("anamorphic scaling", see page 48, section titled "Sequence control table", 2nd paragraph), display and display memory means ("output buffers" and "monitors"), user input means (the system allows the "manipulation" of the objects displayed and a "real-time interaction", see e.g. the introductory paragraph of document D2), furthermore control processor means ("microprocessor controller", see Figures 7 and 8), and normalizing means ("format converter", see page 54, left-hand column, 3rd paragraph), all components functionally connected as defined in the present claim under consideration. In addition, image data may be interpolated for zooming (scaling) purposes (see page 48, section titled "Sequence control table", 2nd paragraph).

5. Whereas the disclosure of these features by document D2 has not been disputed by any of the parties to the appeal procedure, the appellant clearly objected to the view taken by the respondent that the object memory modules were intended to store raw image data which
have been produced by a plurality of modalities each with a different dynamic range and image data word and that the different dynamic ranges of the stored raw image data were normalised by the image processing means. The appellant considered the opposite true, arguing that document D2 mentioned 8 bits/voxel as the only data format used.

However, as explained on page 48 in section titled "Display of multiple, independent objects", up to 64 "independently configurable objects" may be loaded into the object memory modules of the processing elements PE. To the "configurable" parameters included into the object descriptor block ODB, the parameter "format" belongs which specifies inter alia the gray scale depth of the voxel data. Moreover, in each memory module, data "are organized into groups of eight voxels ... occupying a pair of 32-bit words", that means that the 8 bit per voxel is the maximum bit depth which is determined by the particular hardware configuration. This configuration allows image data to be stored which have a bit depth of less than 8 bits per voxel (compare page 54, left-hand column of document D2). Therefore, the skilled person would clearly understand that the GODP system allows to store image data of different formats in the base memory simultaneously.

6. Before the first instance and in the course of the appeal procedure the meaning of "raw image data" was another object of dispute. This, however, is not an issue any more since document D2, which is now considered as the closest piece of prior art, explicitly refers to data stored in the object memory modules as the "raw data", using the term essentially in the same meaning as the patent under dispute.
7. It follows that the only feature left which distinguishes the claimed image viewing station from the prior art system is the fractional bilinear algorithm for interpolating image data for zooming. A technical realisation of such an algorithm for the same purpose, namely the scaling of image data, is known from document D3. According to the respondent such a fractional bilinear interpolation for zooming does, for this reason, not contribute to inventive step. The appellant did not raise objections against this conclusion.

The Board concurs with the view of the respondent since the skilled person would consider it an obvious option to add a feature suitable for implementing a given function of a prior art apparatus or system if this feature is disclosed in some other piece of prior art as suitable for this purpose. Since this is clearly the case for the claimed interpolation algorithm, this feature does not contribute to inventive step. Thus the claim under consideration does not comply with the requirement of inventive step. The appellant's request can, therefore, not be allowed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:
M. Kiehl

P. K. J. van den Berg