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Datasheet for the decision of 13 May 2019

Case Number: T 2238/13 - 3.4.01

Application Number: 08858499.0

Publication Number: 2223139

IPC: G01R33/565, G01R33/567

Language of the proceedings: EN

Title of invention:
REDUCING MOTION ARTEFACTS IN MRI

Applicant:
Koninklijke Philips N.V.

Headword:
MRI motion reduction/PHILIPS

Relevant legal provisions:
EPC Art. 83

Keyword:
Sufficiency of disclosure - (no)

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Case Number: T 2238/13 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 13 May 2019

Appellant: (Applicant)	Koninklijke Philips N.V. High Tech Campus 5 5656 AE Eindhoven (NL)
Representative:	van Velzen, Maaike Mathilde Philips Intellectual Property & Standards High Tech Campus 5 5656 AE Eindhoven (NL)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 19 July 2013 refusing European patent application No. 08858499.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	P. Scriven
Members:	B. Noll
	D. Rogers

Summary of Facts and Submissions

I. This appeal is against the Examining Division's decision to refuse European patent application 08858499.0.

II. The application was refused by reference to the Examining Division's earlier communication, dated 15 April 2013, in which objections were raised, inter alia, under Article 83 EPC (sufficiency of disclosure).

III. In a communication accompanying a summons to oral proceedings, the Board gave its preliminary view, in particular regarding sufficiency of disclosure.

IV. Oral proceedings were held on 13 May 2019. The appellant's final formulation of its requests was that the decision under appeal be set aside and a patent be granted on the basis of the Main Request submitted during the oral proceedings.

V. Claim 1 reads as follows:

> *A method for tracking motion of and/or in a subject in magnetic resonance imaging (MRI), the method comprising:*
> *- identifying movement (10), on the basis of a MRI navigator signal (33), of a moving point (o) within a desired region-of-interest (ROI);*
> *- identifying a fixed point (x) in the subject (2); and*
> *- rotating the moving point relative to the fixed point in accordance with the movement of the moving point to determine a motion*

pattern for the ROI.
wherein the determined motion pattern for the ROI is used to adjust the FOV in a MR image acquisition to reduce motion artefacts.
further comprising selecting the fixed point in a reconstructed image from a MRI scout scan of the subject.
further comprising selecting the moving point in a reconstructed image with motion artefacts from a MRI scout scan of the subject.
wherein the method is applied to scanning in the abdominal or thoracic region or a joint of the subject to reduce motion artefacts."

VI. The appellant argued that the fixed point and the moving point were easily selected by the operator (an experienced physician) in the images reconstructed from two scout scan frames. *Fixed point* and *moving point* were not absolute definitions but a moving point defined a point in the series of images which moved more than the fixed point. The figures in the application showed how the fixed and moving points were chosen and how the motion of the moving point was determined. The experienced physician would be able reliably to select the fixed and moving points by virtue of his practical experience. Having determined the fixed point and the moving point, the motion pattern of the ROI could also be determined. Knowledge of the motion pattern was sufficient to reduce motion artifacts.

Reasons for the Decision

1. The application relates to reducing motion-induced artefacts in magnetic resonance imaging (MRI).

2. As set out in the application (page 1, lines 8-15), MRI imaging is rendered difficult if the patient, or an individual organ, moves during image acquisition. Such motion can result in image artifacts, which can lead to a loss of detail and even, in the worst case, misdiagnosis. In MRI diagnostics of portions of the body located within the thorax, motion artifacts may occur due to cardiac and respiratory motion, which cannot be suppressed by the patient or by using anaesthesia.

3. The invention set out by claim 1 relates to a method for tracking motion of, or in, a subject. It teaches the determination a motion pattern for a region of interest (ROI) and the adjusting a field of view (FOV) using the determined motion pattern, thereby reducing motion artefacts. For this purpose, a fixed point of the diagnosed subject is identified by selecting a fixed point in a reconstructed image from an MRI scan. The fixed point serves as a center of rotation. A moving point is likewise selected from the reconstructed image. The rotation of the moving point about the fixed point defines a motion pattern, and this is used to adjust the field of view for reducing motion artefacts.

4. In the present case, the application should disclose the invention in a manner sufficiently clear and complete, so that the skilled person is able to provide a method for MRI imaging by which a reduction of motion

artefacts caused by a rotational movement of the subject to be imaged can be reliably obtained.

5. The application only teaches the skilled person that she must define a rotation of an area of interest in an MRI image and that the operator must select a fixed and a moving point in the viewed image.

6. In the Board's judgment, the method is not so clearly and completely disclosed as Article 83 EPC requires, since the application does not sufficiently clearly and completely disclose how the fixed point and the moving point should be selected such that the method for MRI, as defined above in para. 3, can be put into effect.

7. Contrary to the appellant's view, it is not enough to leave the determination of a fixed point and a moving point solely to the skill and experience of the operator. An operator can select points arbitrarily, but this does not, with any expectation of success, lead to a reduction in artefacts. The successful implementation of the invention, therefore, depends on the subjective skill of the operator, i.e. whether he is able to recognize artifacts caused by a rotational motion, and is able, then, reliably to identify the center point. The teaching of the application is incomplete in that it does not explain how a centre of rotations can be identified, or even whether there is such a point.

8. Also contrary to the appellant's view, Figures 1A, 1B and 3 to 6 do not provide any guidance on how to select a fixed point for the purpose of reducing image artifacts. These figures are purely schematic and show only how to rotate a given FOV, once fixed and moving points have been selected. They do not illustrate how a

fixed and a moving point, for determining a motion pattern suitable for reducing motion artefacts, can be identified in a real image reconstructed from an MR scout scan of (say) a real renal artery.

9. Furthermore, and separate from the above finding, the skilled person cannot infer from the method as defined in claim 1, how the step of identifying movement of a point "on the basis" of the navigator signal can be carried out at all with a single scout frame. Unlike the procedure defined in claim 1, the embodiment of Figure 3 shows that the positions of the mapping of a certain point of the subject in two scout frames are determined and related to the corresponding values of the navigator signal. Based on the relationship, future positions of the point - and, thus, its motion - can be determined on the basis of the navigator signal. However, claim 1 specifies that the point in question is selected in a single scout frame only. There is no disclosure of how future movement of the point can be determined on the basis of the navigator signal without knowledge of the relationship between the motion of the point and the navigator signal. Therefore, claim 1 does not comply with Article 83 EPC also for this reason.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

R. Schumacher P. Scriven

Decision electronically authenticated