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**Datasheet for the decision
of 1 December 2016**

Case Number: T 0623/13 - 3.4.02

Application Number: 06728184.0

Publication Number: 1877774

IPC: A61B5/145

Language of the proceedings: EN

Title of invention:

OPTICAL SENSOR DEVICE AND IMAGE PROCESSING UNIT FOR MEASURING
CHEMICAL CONCENTRATIONS, CHEMICAL SATURATIONS AND BIOPHYSICAL
PARAMETERS

Applicant:

Cnoga Holdings Ltd. ,

Headword:

Relevant legal provisions:

EPC 1973 Art. 84

Keyword:

Claims - clarity (no) - claim must be clear in itself

Decisions cited:

T 1129/97, T 0049/99, T 0056/04, T 0621/12

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 0623/13 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 1 December 2016

Appellant: Cnoga Holdings Ltd. ,
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Representative: Modiano, Micaela Nadia
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 15 October 2012
refusing European patent application No.
06728184.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Bekkering
Members: A. Hornung
T. Karamanli

Summary of Facts and Submissions

- I. The applicant lodged an appeal against the decision of the examining division refusing European patent application No. 06728184.0 on the basis of Article 97(2) EPC because the main request then on file did not fulfil the requirements of Articles 123(2), 84 and 83 EPC. The set of claims of the first and sole auxiliary request then on file was found to be not compliant with at least the requirements of Article 123(2) EPC.
- II. The appellant requested that the appealed decision be set aside and a patent be granted on the basis of the claims according to a main request or an auxiliary request, both requests filed on 1 November 2016 in response to the summons to oral proceedings.
- III. Oral proceedings were held on 1 December 2016.
- IV. Independent claim 1 according to the main request reads as follows:
- "A method of measuring one or more biophysical parameters of a mammalian subject, the method comprising:
- a. providing a still or video electronic color image of a tissue of the mammalian subject; and
- b. using an image processing unit for electronically processing said color image to generate output indicative of the biophysical parameter of the mammalian subject, wherein the electronic processing includes analyzing color properties of cells of the imaged biological tissue,
- characterized in that

the providing of the still or video electronic color image of the tissue is by using an array of photodetectors, each photodetector in the array configured to sense a continuous or discrete spectrum of light having a wavelength between 280 nm and 4500 nm, the array positioned to receive light reflected from and/or traversing the tissue so as to obtain color images comprising temporal per pixel information for a first finite range of wavelength associated with a first visible color, the first visible color having an absorption distribution function decaying outside the first finite range, temporal per pixel information for a second finite range of wavelength associated with a second visible color, the second visible color having an absorption distribution function decaying outside the second finite range and temporal per pixel information for a third finite range of wavelength associated with a third visible color, the third visible color having an absorption distribution function decaying outside the third finite range, the array for producing electric signals over time derived from a sequence of the color images, the first, second and third visible colors having overlapping wavelengths, the array of photodetectors configured to sense the spectrum of light and produce the electric signals whether the incident light incident on the first tissue from the light source is filtered or unfiltered;

and further characterized in that

the electronic processing comprises using computer readable storage containing instruction data that transforms per pixel information for the first, second and third colors to transformed per pixel information for the first, second and third colors,

and further characterized in that

the electronic processing comprising determining values of meta-parameters by equating functions of ratios of the transformed per pixel information for the first, second and third colors to a pre-defined function of meta-parameters and then solving for the values of the meta-parameters under mathematical constraints, wherein the ratios are of temporal transformed per pixel information for at least one of the visible colors to temporal transformed per pixel information for at least another of the visible colors,

and further characterized in that

the image processing unit adapted to process the color images and obtain measurement data for the one or more biophysical parameters whether the incident light incident on the first tissue from the light source is filtered or unfiltered,

and further characterized in that

the equating of the ratios to the pre-defined functions of meta-parameters is given by equation (4)

$$F_{ij}(C_{ij}(t)) = G_{ij}(R', G', B'), \quad i=1,2,\dots,L, \quad j=1,2,\dots,N, \quad (4)$$

wherein the $C_{ij}(t)$ are the meta-parameter solutions at a time (t) with the meta-parameter solutions numbered by indices ij , F_{ij} are the pre-defined functions of meta-parameters with the pre-defined functions numbered by indices ij , the G_{ij} are the functions of the R', G', B' , the G_{ij} functions numbered by indices ij , L and N are finite numbers, wherein R', G', B' is the transformed per pixel information for the red, green and blue color space, wherein the mathematical constraints comprise a boundary condition

and wherein a pre-defined function of meta-parameters for equation (4) is given by equation (6)

$$F_{ij}(C_{ij}) = C_{0j} / (C_{0j} + C_{ij}), \quad (6)$$

wherein the C_{ij} are the meta-parameter solutions."

Auxiliary request

Independent claim 1 according to the first auxiliary request differs from claim 1 of the main request only in that it comprises the following additional feature:

"and extracting the biophysical parameter measurement data from the meta-parameters using an iterative process having the form

$$S_u^{I,J}(t) = Q[R_m^u(\{C^{I',J'}(t')\}, R', G', B')] \quad (9)$$

wherein $S_u^{I,J}(t)$ denotes the biophysical parameter computed

for pixel I, J, wherein $\{C^{I',J'}(t')\}$ is the set of biophysical meta-parameter vectors at pixel (I',J'), m is the iteration number of the iteration process for biophysical parameter R^u and Q is a mathematical function chosen specifically for the R^u of equation (9)".

Reasons for the Decision

1. Main request

The subject-matter of claim 1 of the main request is not clear (Article 84 EPC 1973) at least for the two following reasons:

1.1 "*Transformed per pixel information*"

1.1.1 The method of claim 1 comprises a step for providing color images comprising "*temporal per pixel information*". According to claim 1, an electronic processing step transforms said "*per pixel information*" to "*transformed per pixel information*" (R', G', B'). The subsequent mathematical processing of claim 1 uses this "*transformed per pixel information*" (R', G', B') to determine the meta-parameters C_{ij} by solving equation (4) of claim 1. According to the description, example 7, equation (9), the desired biophysical parameters are computed from these meta-parameters C_{ij} . Therefore, it is essential that the meaning of "*transformed per pixel information*" is clear. However, claim 1 neither defines the transformation for obtaining the "*transformed per pixel information*", nor the content of the transformed information finally obtained by the electronic processing. The board is, therefore, of the opinion that leaving the meaning of the "*transformed per pixel information*" undefined contravenes the clarity requirement of Article 84 EPC 1973.

1.1.2 During oral proceedings, the appellant argued that the meaning of "*transformed per pixel information*" was clear from the wording of claim 1, which defined "wherein R', G', B' is the transformed per pixel information for the red, green and blue color space". As would be known to the person skilled in the art, the transformation under debate was a coordinate transformation of the initial "*temporal per pixel information*" from the RGB color space to another conventional color space, as explained in example 1 on page 53 of the description. Concrete examples of the

transformation were given in example 2 on pages 53 to 55 of the description. The skilled person would also know that one of the goals of the transformation was to save the amount of data to be processed by compressing and subsequently decompressing image data. Another known goal of the transformation was to achieve better color separation in the transformed color space, for instance, for emphasizing the change of the tint of a subject's skin.

The board does not find this argument persuasive since the claims must in principle be clear in themselves when read by the person skilled in the art (cf. T 621/12, Reasons, point 2). In the present case, the method claim 1 does not define the meaning of the "*transformed per pixel information*". This, however, would be necessary for solving the equation (4) in claim 1 and, hence, for obtaining the desired result of measurement data for the biophysical parameters. This clarity deficiency in the claim wording cannot be rectified by the fact that the description could possibly help the reader to understand the technical subject-matter which the claim was intended to define (see in this respect decision T 49/99, Reasons, point 12, referring to decision T 1129/97, OJ EPO 2001, 273, Reasons, points 2.1.2 and 2.1.3). The board is aware of the jurisprudence which acknowledges that an exception to this principle may exist in the particular circumstances of a case (see e.g. decision T 56/04). However, the board sees no exceptional circumstances in the present case that would justify the use of the description for the definition of the matter to be protected by claim 1 as required in Article 84 EPC 1973. The board also notes that the appellant has not provided any argument that the present case involved such exceptional circumstances. Concerning the alleged knowledge of the skilled person, the appellant provided no supporting evidence.

1.2 Function $G_{ij}(R', G', B')$

1.2.1 The function $G_{ij}(R',G',B')$ is used in equation (4) of claim 1. Concerning this mathematical function, claim 1 merely states that "the G_{ij} are the functions of the R', G', B' ". No further information is given in claim 1 about the type, effect or aim of the function $G_{ij}(R',G',B')$. Since, however, the exact knowledge of the mathematical expression of the function $G_{ij}(R',G',B')$ is essential for solving the equation (4) and allowing to provide the meta-parameters C_{ij} , the board is of the opinion that claim 1 is not clear within the meaning of Article 84 EPC 1973.

1.2.2 During oral proceedings, the appellant argued that the meaning of the function $G_{ij}(R',G',B')$ was explained in the description of the patent application and that the skilled person would understand how to solve equation (4) of claim 1. In a simplified, exemplary case, the appellant demonstrated on a flip-chart how to solve equation (4) for two meta-parameters C_0 and C_1 by using information about $G_{ij}(R',G',B')$ which was provided in example 5 on page 57 of the description and information about boundary conditions provided in example 3 on page 56 of the description. The appellant further contended that the function $G_{ij}(R',G',B')$ would be known by the skilled person because it was linked to the biophysical parameter to be measured and these links between $G_{ij}(R',G',B')$ and the desired biophysical parameters were known in the art.

The board is not convinced by these arguments for essentially the same reasons as those given in point 1.1.2. above, i.e. claim 1 must be clear in itself.

2. Auxiliary request

Claim 1 of the auxiliary request differs from claim 1 of the main request in that it comprises a step of extracting the biophysical parameter measurement data from the meta-parameters using an iterative process having the form of equation (9). This amendment, however, does neither clarify the meaning of the "*transformed per pixel information*" nor the meaning of the function $G_{ij}(R',G',B')$. The applicant provided no further arguments in favor of clarity of claim 1 than those arguments already submitted for claim 1 of the main request.

Therefore, claim 1 of the auxiliary request lacks clarity for the same reasons as those given in points 1.1 and 1.2 above (Article 84 EPC 1973).

3. In view of the above, none of the appellant's requests is allowable and, therefore, the board sees no reason to set aside the contested decision. Consequently, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



M. Kiehl

R. Bekkering

Decision electronically authenticated