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Datasheet for the decision
of 2 July 2020

Case Number: T 2153/14 - 3.5.04

Application Number: 08762935.8

Publication Number: 2232441

IPC: G06T7/00

Language of the proceedings: EN

Title of invention:
METHOD AND SYSTEM FOR PROCESSING MULTIPLE SERIES OF BIOLOGICAL
IMAGES OBTAINED FROM A PATIENT

Applicant:
Olea Medical

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - main and auxiliary request (no)

Decisions cited:

Catchword:

Case Number: T 2153/14 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 2 July 2020

Appellant: Olea Medical
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Decision under appeal: **Decision of the Examining Division of the**
                               European Patent Office posted on 23 June 2014
                               refusing European patent application
                               No. 08762935.8 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman   C. Kunzelmann
Members: B. Willems
                  B. Müller

Summary of Facts and Submissions

I.   The appeal is against the decision of the examining
        division dated 23 June 2014 refusing European patent
        application No. 08762935.8 pursuant to Article 97(2)
        EPC. The application was published as international
        application WO 2009/066136 A2.

II.   The documents cited in the decision under appeal
        included the following:

        D1: WO 2007/058632 A1;

        D8: H.A.F. Gratama van Andel et al: "*Removal of bone in
        CT angiography by multiscale matched mask bone
        elimination*", 31 August 2007, XP12103149.

III.   The application was refused on the following grounds.

        -   Claim 1 of the main request and the first auxiliary
            request then on file did not meet the requirements
            of Article 84 EPC (see decision, points 15 and 30
            of the Reasons).

        -   Claim 1 of the main request and the first auxiliary
            request then on file did not specify processing
            multiple series of biological images obtained from
            a patient affected by an ischemic stroke.
            Therefore, D8 was an appropriate starting point for
            the assessment of inventive step (see decision,
            points 16 to 18 and 30 of the Reasons). The
            subject-matter of claim 1 of the main request and
            the first auxiliary request did not meet the
            requirements of Article 56 EPC because it lacked
            inventive step over the disclosure of D8 combined

with the common general knowledge of the person
skilled in the art (see decision, points 19 to 24
and 31 to 35 of the Reasons).

- The subject-matter of claim 1 of the second
  auxiliary request then on file did not meet the
  requirements of Article 56 EPC because it lacked
  inventive step over the disclosure of D1 combined
  with the common general knowledge of the person
  skilled in the art (see decision, points 37 to 46
  of the Reasons).

IV.   The applicant (hereinafter: appellant) filed notice of
       appeal. With the statement of grounds of appeal, the
       appellant filed claims according to a main request and
       an auxiliary request and submitted that this main
       request corresponded to the second auxiliary request
       forming the basis for the decision under appeal (see
       statement of grounds, page 1, last paragraph). It
       requested that the decision under appeal be set aside
       and that a European patent be granted on the basis of
       the claims of the main request or the auxiliary request
       filed with the statement of grounds. The appellant
       indicated a basis for the claims in the application as
       filed and provided arguments as to why the claims met
       the requirements of Articles 54 and 56 EPC.

V.   The board issued a summons to oral proceedings. In a
       communication under Article 15(1) RPBA (Rules of
       Procedure of the Boards of Appeal, OJ 2007, 536),
       annexed to the summons, the board introduced documents
       D9 (US 2003/0045791 A1) and D10 (EP 1 860 453 A1) into
       the appeal proceedings and gave the following
       preliminary opinion.

- Claim 1 of the main request and the auxiliary request did not validly claim the priority of the previous application (Article 87(1) EPC). Therefore, document D10 was prior art under Article 54(2) EPC.

- The subject-matter of claim 1 of the main request and the auxiliary request lacked inventive step over the combined disclosures of documents D1 and D9 and the common general knowledge of the person skilled in the art (Article 56 EPC).

- The subject-matter of claim 1 of the main request and the auxiliary request lacked inventive step over the combined disclosures of documents D1 and D10 and the common general knowledge of the person skilled in the art (Article 56 EPC).

VI.   With its reply dated 14 April 2020, the appellant filed amended claims according to a main request and an auxiliary request replacing the previous requests on file. It indicated a basis for the amendments in the application as filed and submitted arguments as to why the claimed priority was valid (Article 87 EPC) and the amended claims met the requirements of Articles 54 and 56 EPC. The appellant announced that it would not be attending the oral proceedings scheduled for 14 May 2020.

VII. The board notified the appellant that the oral proceedings to be held on 14 May 2020 had been cancelled. In a communication dated 23 April 2020, the appellant was asked whether, in view of its announcement that it would not be attending the oral proceedings, it wished to withdraw its request for oral proceedings.

VIII.   The appellant informed the board that it did not wish
         to have new oral proceedings scheduled.

IX.   Claim 1 of the main request and claim 1 of the
         auxiliary request read as follows (the additional
         features of claim 1 of the auxiliary request are in
         italics):

         "A method for identifying a region representing an area
         affected by an ischemic stroke, performed by a
         processing entity (102) of a computing apparatus (100),
         said apparatus comprising input means (108) *and output
         means (110)* communicatively coupled to said processing
         entity (102), said method comprising obtaining a
         plurality of series (306) of biological images (304_1,
         304_2, 304_3, 304_4), including a diffusion-weighted image
         series and/or a perfusion-weighted image series,
         obtained from a patient affected by an ischemic stroke,
         all series evidencing a plurality of associated
         parameters, wherein certain images in any series are
         corresponding to certain images in other series,
         wherein corresponding images consist in an array of
         pixels or voxels having respective values, all
         corresponding images in any series having same pixel or
         voxel spacing, origin and orientation, characterized in
         that it further comprises (208):

         -    creating a respective segmentation mask (604, 622,
              624) for a selected image (602, 612, 614) in a
              first series, including a diffusion-weighted image
              series and/or a perfusion-weighted image series,
              previously obtained from a patient affected by an
              ischemic stroke, said first series being formed by
              a set of images evidencing a first parameter,
              defining a set of pixels to be eliminated from said
              image and wherein creating a segmentation mask is

based on an input from a user (114) of said
computing apparatus (100) received by said input
means (108);

- applying said segmentation mask to a corresponding
  image in a second series, including a
  diffusion-weighted image series and/or a
  perfusion-weighted image series, previously
  obtained from a patient affected by an ischemic
  stroke, said second series being formed by a set of
  images evidencing a second parameter, said second
  parameter being different than said first
  parameter, wherein applying a segmentation mask to
  said corresponding image comprises creating a
  filtered image for which each pixel or voxel value
  is set to the value of its corresponding pixel or
  voxel of said corresponding image, excluding all
  pixel or voxel values that are set to a baseline
  value when said corresponding pixels or voxels are
  captured by said segmentation mask;

- *outputting by said output means (110) a filtered
  image created from the corresponding image on which
  a segmentation mask was applied*."

X. The examining division considered D1 to be the closest
prior art for the assessment of inventive step (see
decision under appeal, point 37 of the Reasons).

XI. The appellant's arguments, where relevant to the
present decision, may be summarised as follows.

(a) D1 was the closest prior art for the assessment of
inventive step (see statement of grounds of appeal,
page 13, second paragraph, and letter dated
14 April 2020, page 7, fourth paragraph).

(b) D1 did not disclose creating a segmentation mask in
    an image series "*evidencing*" a first parameter and
    applying the mask to images of a second series
    evidencing a second parameter to filter the images
    (see statement of grounds of appeal, the paragraph
    bridging pages 11 and 12, and the letter dated
    14 April 2020, page 7, fifth paragraph).

(c) The problem to be solved might be identified as
    that of extracting information useful for
    diagnostics from a plurality of images (see
    statement of grounds of appeal, page 13, last
    paragraph, and the letter dated 14 April 2020,
    page 8, first full paragraph).

(d) D9 did not clearly disclose using two series of
    images. D9 did not disclose creating a segmentation
    mask in an image series "*evidencing*" a first
    parameter and applying the mask to images of a
    second series evidencing a second parameter to
    filter the images (see letter dated 14 April 2020,
    page 9, first paragraph). The steps of calculating
    and filtering mentioned in D9, paragraphs [0062]
    to [0065] simply consisted of applying a threshold
    in a single series of images (see the letter dated
    14 April 2020, the paragraph bridging pages 8 and 9
    and page 9, first full paragraph).

(e) D9 did not require a user input to create the mask
    (see the letter dated 14 April 2020, page 9, second
    full paragraph).

Reasons for the Decision

1.   *Withdrawal of the request for oral proceedings*

1.1   By letter dated 18 May 2020, the appellant informed the
        board that it did not wish to have a new date for oral
        proceedings appointed ("*Nous vous informons que la
        demanderesse, pour des raisons economiques explicitées
        dans notre courrier du 14 avril 2020, ne souhaite pas
        de nouvelle date de convocation à la procedure orale*")
        but instead wished to have its submissions of
        14 April 2020 taken into account in the written
        proceedings ("*En revanche, la demanderesse souhaite que
        les amendements déposés le 14 avril 2020 soient pris en
        compte dans le cadre de la procedure d'examen de ladite
        demande citée en objet*").

1.2   The appellant's statements referred to in point 1.1
        above are an unambiguous expression of its wish to
        withdraw its request for oral proceedings.

2.   *Main request and auxiliary request – inventive step
        over D1 and D9 (Article 56 EPC)*

2.1   D1 is the closest prior art for the assessment of
        inventive step (see also points X and XI(a) above).

2.2   D1 discloses (see also decision under appeal, points 37
        to 46 of the Reasons, and statement of grounds of
        appeal, page 11) a method for identifying a region
        representing an area affected by an ischemic stroke
        (see paragraphs [0056] and [0057]: "*If the segmented
        GRE region is larger than the segmented FSE region,
        then the stroke is determined to be hemorrhagic [...]
        Otherwise, the stroke is determined to be ischemic
        [...] the brain images may be [...] visually inspected*

*and manually processed to determine if the stroke is
hemorrhagic or ischemic"*), performed by a computer
comprising input means and output means coupled to a
processing entity (see Figure 1). The method comprises
the following steps:

-   obtaining a plurality of series of images including
    a diffusion-weighted image series and a
    perfusion-weighted image series, all series
    evidencing a plurality of associated parameters
    (see paragraph [0035]: "*the captured brain images
    may include two or more of [...] diffusion weighted
    imaging (DWI), perfusion weighted imaging (PWI)
    [...] ADC, CBF, CBV, MTT, TTP, and PKHT maps. In a
    particular embodiment, the superposition may
    include a DWI image and a PWI image [...] a DWI
    image or an ADC MAP may show infarct regions in the
    brain, a PWI image or maps derived from the PWI
    image may show penumbra regions in the brain*");

-   processing corresponding images in the series such
    that they have the same pixel or voxel spacing,
    origin and orientation (see paragraph [0079]: "*the
    brain images, with the contours for delineating the
    actual infarct and penumbra regions, are
    co-registered to a co-ordinate system [such as] a
    2D or 3D Cartesian or Talairach co-ordinate system*"
    and paragraph [0090]: "*two sets of images or atlas
    images may be considered to correspond to each
    other [...] when they satisfy the following
    conditions: 1. Both sets of images have the same
    image size and resolution, and the same number of
    associated atlas images; 2. Both sets of atlas
    images have the same shape of the cortex and
    ventricular system; and 3. Both sets of atlas*

*images are located in the same (e.g. Talairach)
coordinate system*");

- removing noise or background from the captured DWI
  and PWI images (see paragraph [0051]: "*A captured
  brain image may be subject to post-capture
  processing or alteration, such as removal of noise
  or background, intensity correction including field
  inhomogeneity correction*" and paragraph [0072]:
  "*one or more perfusion maps may be used for
  determining the penumbra regions and generating the
  penumbra contours [...] it may be necessary or
  desirable to remove any artifacts and/or geometric
  distortions from the brain images before
  segmentation*");

- creating respective segmentation masks for the DWI
  and the PWI images, based on a threshold which is
  either automatically set or set by the user and
  applying said mask to segment the DWI and PWI
  images (see paragraph [0060]: "*CAD application 208
  may have a routine for automatically segmenting an
  infracted [sic] region from the DWI image, such as
  by using an adaptive intensity threshold*";
  paragraph [0062]: "*For instance, an [sic] region of
  interest may be selected, such as interactively,
  and the selected region, such as a local volume or
  a slice, may be segmented using thresholds
  determined either automatically or interactively
  for the region of interest*"; paragraph [0063]: "*A
  user may dynamically adjust the value of the
  threshold to adjust the contours of the infarct
  regions and inspect the modified view to see if any
  improvement has been made to the segmented image*";
  and paragraph [0072] "*The penumbra regions may be
  segmented either automatically or interactively, or*

*both. For instance, the PWI image may be
automatically and globally segmented using a
suitable thresholding technique*"); and

-   displaying a filtered image created from the
    corresponding image on which a segmentation mask
    was applied (see paragraph [0064]: "*The displayed
    image may be enlarged, or zoomed, and panned to
    allow more precise adjustment of the contours. For
    instance, FIG. 5 shows another screenshot 500 of
    GUI 402, where a pull-down menu window 502 is
    shown. As can be seen, the menu provides menu items
    for modifying the contour lines 406 that enclose
    the infarct regions 408*").

2.3   The board agrees with the appellant that D1 does not
        disclose creating a segmentation mask in an image
        series "*evidencing*" a first parameter and applying the
        mask to images of a second series evidencing a second
        parameter to filter the images (see point XI(b) above).
        Thus, the subject-matter of claim 1 of both requests
        differs from the disclosure of D1 in that artefacts,
        noise and background in a second image (such as a PWI
        image) are filtered based on a mask created for a first
        image (such as a DWI image).

2.4   The board shares the appellant's view that the problem
        to be solved may be identified as that of extracting
        information useful for diagnostics from a plurality of
        images (see point XI(c) above).

2.5   D9 discloses a method for generating images from
        calculated hemodynamic parameters acquired from NMR
        data after contrast agent injection (see
        paragraph [0060]). In a pre-contrast phase (no
        acquisition of hemodynamic parameters), the mean value

of each voxel is calculated and voxels whose
pre-contrast mean value does not exceed a threshold are
removed (see paragraphs [0062] to [0065]). Thus, D9
illustrates that it is advantageous to create a mask
for filtering noise, background and artefacts in an
image in which these can be easily identified and to
then apply the mask to other images. Therefore, the
person skilled in the art would create the masks known
from D1 in an image in which the artefacts to be
removed can be easily identified and then apply the
masks to other images.

2.6   The board has not been persuaded that D9 does not
        disclose the use of two series of images (see
        point XI(d) above). D9, paragraph [0062] discloses that
        the mean value of each voxel is calculated during a
        pre-contrast phase by averaging over a first series of
        N frames during this phase. A mask is created by
        determining those voxels whose mean value does not
        exceed a threshold. This mask is applied to subsequent
        frames (a second series of images) to filter out
        ("*remove from consideration*") voxels which are located
        in the air outside the patient's head (see
        paragraph [0065]). Thus, the mask is generated in a
        first series of images during a pre-contrast phase and
        applied to a second series of images including the
        frames following the contrast arrival time.

2.7   The board agrees with the appellant that D9 discloses a
        method for automatically calculating an arterial input
        function (AIF) from the acquired NMR data (see
        point XI(e) above). However, D1, paragraph [0051]
        discloses that post-capture processing such as noise or
        background removal may be performed automatically by a
        computer or interactively with input from a user. The
        person skilled in the art using the background removal

known from D9 in the method known from D1 would
consider allowing the user to, for instance, manually
input the threshold.

2.8   In summary, the subject-matter of claim 1 of neither
         request meets the requirements of Article 56 EPC
         because it lacks inventive step over the combined
         disclosures of documents D1 and D9 and the common
         general knowledge of the person skilled in the art.

3.   In view of the board's conclusion set out in point 2.8
         above, the questions of the validity of the priority
         and inventive step over the combined disclosures of D1
         and D10 need not be considered.

4.   Since neither request is allowable, the appeal is to be
         dismissed.

Order

For these reasons it is decided that:

         The appeal is dismissed.

The Registrar: The Chairman:

K. Boelicke   C. Kunzelmann

Decision electronically authenticated