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Datasheet for the decision
of 20 August 2019

Case Number: T 1113/14 - 3.5.04

Application Number: 07738595.3

Publication Number: 1998286

IPC: G06T7/00, G06T1/00

Language of the proceedings: EN

Title of invention:
Face-image registration device, face-image registration
method, face-image registration program, and recording medium

Applicant:
OMRON CORPORATION

Headword:

Relevant legal provisions:
EPC 1973 Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Case Number: T 1113/14 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 20 August 2019

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Decision under appeal:	Decision of the Examining Division of the European Patent Office posted on 9 December 2013 refusing European patent application No. 07738595.3 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman	C. Kunzelmann
Members:	R. Gerdes
	B. Müller

Summary of Facts and Submissions

I.   The appeal is directed against the decision to refuse
        European patent application No. 07 738 595.3, published
        as European patent application EP 1 998 286 A1.

II.   The patent application was refused by the examining
        division on the grounds that, *inter alia,* the subject-
        matter of independent claim 1 of the main request
        lacked inventive step in view of the disclosure of
        document:

        D8:   Clippingdale, S.; Ito, T.: Partial automation
        of database acquisition in the FAVRET face tracking and
        recognition system using a bootstrap approach, IAPR
        Workshop on Machine Vision Applications, 28 to
        30 November 2000; Tokyo, Japan, XP055027899

III.   The applicant filed notice of appeal against this
        decision, requesting that it be set aside.

IV.   In a communication under Article 15(1) RPBA, which was
        annexed to the summons to oral proceedings, the board
        made several observations regarding lack of clarity of
        the claims. As far as an assessment of inventive step
        was possible in view of these observations, the board
        agreed with the reasoning in the decision under appeal.

V.   With a reply to the summons dated 19 July 2019, the
        appellant submitted amended claims 1 to 11 to replace
        the set of claims currently on file. It also provided
        arguments regarding clarity and inventive step of the
        claimed subject-matter.

VI.   Oral proceedings were held before the board on
         20 August 2019. As announced beforehand, the appellant
         did not attend.

         The Chairman noted that the appellant had requested in
         writing that the decision under appeal be set aside and
         that a European patent be granted on the basis of the
         claims of the sole request filed by the letter dated
         19 July 2019.

VII.   Claim 1 of the sole request reads as follows:

         "A face-image registration device (1) that (i)
         automatically extracts, from a moving image which is
         constituted by a plurality of frames which are
         continuously strung and is inputted thereto, a face
         image which is a still image showing a face of a person
         and (ii) automatically registers the face image in a
         dictionary (15) for face image recognition, the face-
         image registration device (1) comprising:

              representative-face-image extracting means (12)
              which is configured to automatically extract, from
              the moving image, at least one face image which
              satisfies a predetermined representative condition,
              so as to obtain a representative face image;

              registration-face-image extracting means (13) which
              is configured to:

              (i) search, from the moving image, a face image
              which shows the person shown in the representative
              face image,

              (ii) select, from a plurality of predetermined
              registration conditions included in a condition

list (50), each of which defines characteristics of
a face image, a predetermined registration
condition for which a flag, indicating that a face
image satisfying the registration condition is
already registered in the face-image dictionary
(50) (*sic)*, is not set in the condition list (50),

(iii) judge whether or not the face image thus
searched satisfies the predetermined registration
condition thus selected,

(iv) set a flag for the predetermined registration
condition thus selected, in the condition list
(50), when the face image thus searched is judged
to satisfy the predetermined registration condition
thus selected, and

(v) extract, from the moving image, the face image
judged to satisfy the predetermined registration
condition thus selected; and

face-image registration means (14) which is
configured to automatically register the extracted
face image, in the dictionary (15), as the
registration face image, in association with the
representative face image,

wherein the registration-face-image extracting
means (13) is further configured not to select,
from the plurality of predetermined registration
conditions, the predetermined registration
condition for which a flag is set on the condition
list (50)."

VIII.   In the decision under appeal, the examining division
        held that the subject-matter of then claim 1 was

distinguished from D8 in that selected images were not
automatically registered but first supplied to a user
for confirmation. In addition, according to D8, the
user selected the best registration image for a given
condition, whereas in the automatic device according to
claim 1, the search for suitable images satisfying a
particular condition was stopped when an appropriate
image was found. If the skilled person had regarded the
automatic system as sufficiently robust, it would have
implemented a fully automatic system. The skilled
person would also have considered selecting the first
suitable image out of "mere economy reasons" (see
decision under appeal, Grounds for the decision,
points 1.1 and 1.3).

IX.   The appellant's arguments, as far as relevant to the
        present decision, may be summarised as follows:

        Regarding the interpretation of the term "registration
        condition", the appellant argued that in light of the
        description, a registration condition (see page 10,
        lines 3 to 10) was "a condition satisfied by a face
        image which is suitable for face recognition" with
        examples such as "a face looking upward; a face having
        beard, and a face with its mouth opened". According to
        claim 1, each condition satisfied by a face image
        suitable for face recognition was selected only if the
        face image satisfying the registration condition had
        not been registered in the dictionary, and thus each
        registration condition was used only once for
        registering a face image.

        In D8, the selection of frames showing poses close to
        multiples of 10 degrees was a mere selection, and did
        not comprise any non-selection of certain poses, let
        alone of predetermined registration conditions

satisfied by face images already registered. A search
for images corresponding to an "already found
condition" was not disclosed in D8. D8 did not disclose
the registration-face-image extracting means and the
face-image registration means of claim 1.

The examining division failed to define the objective
technical problem taking into account the combination
of distinguishing features. The technical problem was
to increase the efficiency and to reduce the load of
the registration process by reducing the number of
steps, in particular the extraction steps, required to
perform the process.

No incentive was derivable from D8 that could lead to
modifications resulting in the subject-matter of
claim 1. D8 was silent on any way of checking whether
the face image satisfying a predetermined registration
condition had previously been registered in the
dictionary. There were various other implementation
options for constructing the dictionary. Indeed, D8
disclosed in figure 5 that face-image extraction was
performed twice with respect to the same person and
under the same condition ("pose +8"). D8 was also
silent on any way of not selecting predetermined
registration conditions which had already been
registered. Hence, even if the device of D8 was
automated, the resulting system would lack such
checking and non-selection (see statement of grounds of
appeal and letter dated 19 July 2019, point 4.d).

Reasons for the Decision

1.   The appeal is admissible.

The disclosed invention

2.   The application concerns a face-image registration
          device. To increase the accuracy of a face recognition
          system, a dictionary is composed of various images of a
          person's face. For this dictionary, a "representative-
          face-image" such as a frontal view of the person's face
          is extracted from a video sequence. In addition,
          several images are selected (registration-face-images),
          each of the images being taken under specific
          conditions, such as varying brightness or with the
          image showing the person's face from a certain
          direction (see page 1, page 2, first paragraph and
          pages 9 and 10). The dictionary will comprise
          "representative-face-images" of several persons and the
          corresponding "registration-face-images".

          To simplify the registration process, a "pickup
          condition list" is defined. This list specifies
          conditions that have to be satisfied by a face image to
          be registered in the dictionary. A flag in the pickup
          condition list serves to indicate conditions for which
          no matching image has yet been registered (see page 37,
          first paragraph, and page 42, second paragraph, to
          page 43, second paragraph).

Inventive step, Article 56 EPC 1973

3.   The appellant did not dispute that D8 may be considered
          the closest prior art.

3.1   D8 discloses a face-image registration device that
        extracts images from a video sequence, the images
        showing the face of a person. The face-image
        registration device of D8 registers the image in a
        dictionary, which is built from 19 views of each
        individual taken at nominally 10-degree intervals
        between -90 to +90 degrees. The views include a frontal
        pose taken from an angle of 0 degrees (see abstract and
        chapter 1: Introduction together with figure 1).

        The process carried out by the face-image registration
        device of D8 includes steps of searching in the video
        sequence for candidate face regions matching that of
        the person in the representative-face-image (see
        chapter 4). It also comprises selecting a condition
        ("head pose") for which no image has been registered
        yet and judging whether the searched image satisfies
        the condition. If the registration condition is
        satisfied, the image is stored in the dictionary. The
        selection and registration of images for the dictionary
        in D8 is essentially carried out by an operator (see
        chapter 1, chapter 2: "The registration procedure
        requires a skilled operator", chapters 3 and 4).

3.2   It follows that D8 does not disclose the automatic
        extraction and registration of the face images. D8 also
        does not disclose those operations of the registration-
        face-image extracting means which use a flag
        "indicating that a face image satisfying the
        registration condition is already registered in the
        face-image dictionary". Hence, the following features
        distinguish the subject-matter of claim 1 from the
        disclosure of D8:

        "(ii) select, from a plurality of predetermined
        registration conditions included in a condition list

(50), each of which defines characteristics of a face
image, a predetermined registration condition for which
a flag, indicating that a face image satisfying the
registration condition is already registered in the
face-image dictionary (50), is not set in the condition
list (50),"

"(iv) set a flag for the predetermined registration
condition thus selected, in the condition list (50),
when the face image thus searched is judged to satisfy
the predetermined registration condition thus
selected," and

"wherein the registration-face-image extracting means
(13) is further configured not to select, from the
plurality of predetermined registration conditions, the
predetermined registration condition for which a flag
is set on the condition list (50)."

3.3   The board is not convinced by the appellant's argument
       that D8 did not also disclose the registration-face-
       image extracting means and the face-image registration
       means of claim 1. It is true that D8 does not
       explicitly refer to such means. However, the
       functionality necessary for extracting face images and
       registering them is disclosed in D8 (see point 3.1
       above). Hence, these means are implicitly disclosed in
       D8 except for the functionality defined in the above
       distinguishing features. Furthermore, the appellant
       argued that D8 did not comprise any non-selection of
       certain poses satisfied by face images which were
       already registered. As indicated above, the
       corresponding features of claim 1 are the
       distinguishing features which relate to the use of a
       flag "indicating that a face image satisfying the

registration condition is already registered in the
face-image dictionary".

3.4   Regarding the technical effects of the features
        distinguishing claim 1 from D8, it can be derived from
        the reasoning in the decision under appeal that the
        examining division considered the distinguishing
        features as serving to automate the face-image
        registration device and to provide an economic solution
        for the composition of the face-image dictionary (see
        decision under appeal, Grounds for the decision,
        points 1.1 to 1.3). The board agrees with this
        assessment also in view of the amended claim 1.

3.5   The appellant formulated the technical problem as how
        to increase efficiency and reduce the load of the
        registration process by reducing the number of steps,
        in particular the extraction steps, required to perform
        the process (see statement of grounds, page 10, first
        paragraph).

3.6   This formulation compares the claimed device with an
        imaginary prior-art system that selects registration
        conditions even if a corresponding face image has
        already been registered in the dictionary. However, D8
        does not disclose such a system. D8 is silent on these
        implementation details. In addition, the appellant's
        formulation of the technical problem does not address
        the automatic operation of the claimed device.

3.7   Hence, the resulting objective technical problem is how
        to completely automate the device of D8 and how to
        efficiently implement that device.

3.8   D8 refers to a system which has been partially
        automated. It is evident that the person skilled in the

art would have wanted to completely automate this system if the automation of the remaining steps could be effected with sufficient reliability (see D8, chapter 4).

3.9   It is also an obvious implementation detail to only consider face images having a pose for which no corresponding pose has already been stored in the dictionary. D8 discloses a dictionary having a single face image for every 10 degrees for a given person (see chapter 1, second paragraph). It is evident that such a dictionary can be completely filled by only considering face images having a pose for which no sample exists in the dictionary. The use of a flag and a "condition list" to keep track of processed or "satisfied" conditions is a standard measure in software engineering.

3.10   The board agrees with the appellant that D8 is silent on any way of checking whether a face image satisfying a predetermined registration condition had been previously registered in the dictionary. It also agrees that there are other implementation options for composing the dictionary. Nevertheless, the employed measures are usual implementation options, the advantages and disadvantages of these options being well known in the concerned technical field of image recognition.

3.11   The appellant also argued that D8 disclosed in figure 5 that face-image extraction was performed twice with respect to the same person and under the same condition, i.e. for "pose +8" (see point IX above).

3.12   It is correct that figure 5 shows two face images of the same person being designated with "pose +8".

However, this does not mean that the face image is considered twice for registration in the dictionary. To determine whether a face image satisfies a certain condition (in D8, whether it has a certain pose), it is necessary to determine the pose of the face image. Any further step may be skipped if it is determined that another face image with that pose had already been registered. Thus, the presence of two face images with "pose +8" in figure 5 does not alter the fact that D8 does not provide any information about whether a check for the presence of a face image in the dictionary with the same registration condition takes place. Hence, the appellant's argument has not convinced the board.

3.13   In view of the above, the subject-matter of claim 1 lacks an inventive step in view of D8 and the common general knowledge.

Conclusion

4.   Since the only request of the appellant is not allowable, the appeal has 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