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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

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

Appellant: OMRON CORPORATION
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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