Datasheet for the decision of 20 July 2012

Case Number: T 1039/08 - 3.4.01

Application Number: 05253006.0

Publication Number: 1598769

IPC: G06K 9/00, G06K 9/62

Language of the proceedings: EN

Title of invention: Method and apparatus for face description and recognition

Applicants:
Mitsubishi Electric Information Technology Centre Europe B.V.
MITSUBISHI DENKI KABUSHIKI KAISHA

Opponent: -

Headword: -

Relevant legal provisions: -

Relevant legal provisions (EPC 1973): EPC Art. 84

Keyword: "Clarity (no; all requests)"

Decisions cited: -

Catchword: -
Case Number: T 1039/08 - 3.4.01

DECISION
of the Technical Board of Appeal 3.4.01
of 20 July 2012

Appellant: Mitsubishi Electric Information Technology Centre Europe B.V. 20 Frederick Sanger Road, The Surrey Research Park Guildford GU2 7YD (GB)

Appellant II: MITSUBISHI DENKI KABUSHIKI KAISH 7-3, Marunouchi 2-chome Chiyoda-ku Tokyo 100-8310 (JP)

Representative: Whitlock, Holly Elizabeth Ann R.G.C. Jenkins & Co 26 Caxton Street London SW1H ORJ (GB)


Composition of the Board:
Chairwoman: F. Neumann
Members: H. Wolfrum M. J. Vogel
Summary of Facts and Submissions

I. European patent application 05 253 006.0 (publication No. EP 1 598 769) was refused by a decision of the examining division dispatched on 20 November 2007 for reason of lack of clarity (Article 84 EPC 1973) of the claims of the requests then on file.

II. The applicants lodged an appeal against the decision on 30 January 2008. The prescribed appeal fee was paid on the same day. A statement setting out the grounds of appeal was filed on 31 March 2008.

The appellants requested that the decision be set aside and a patent be granted on the basis of a main request or four auxiliary requests, all filed with the statement setting out the grounds of appeal.

Furthermore, an auxiliary request for oral proceedings was made.

III. On 16 March 2012 the appellants were summoned to oral proceedings to take place on 24 July 2012.

In an annexed communication pursuant to Article 15(1) RPBA the Board commented on the issues to be addressed during the oral proceedings. In this context, the Board pointed inter alia to a variety of clarity problems for all of the requests on file.

IV. The appellants did not comment on the Board's observations nor did they file any further amendments. Instead, the appellants withdrew their request for oral proceedings by letter of 9 May 2012.
V. Oral proceedings were cancelled by notification of 18 July 2012.

VI. Independent claim 1 of the appellant's main request reads as follows:

"1. A method of representing an image by a descriptor, the method comprising:
   extracting a set of component images from the image, each component image corresponding to a segment of the image;
   transforming the component images into the frequency domain;
   deriving feature vectors using the transformed component images in the frequency domain; and
   processing the feature vectors to generate a descriptor representative of the image, wherein the processing step comprises performing a series of discrimination transformations,
   characterised in that the series of discrimination transformations has at least three stages and wherein features extracted from the entire image area are combined with features from a central image area in the final stage of the series of discrimination transforms."

Further independent claims 21, 23 and 24 are directed respectively to a method of performing face recognition or detection or classification comprising comparing a descriptor derived using a method according inter alia to claim 1 with stored descriptors representative of facial images, an apparatus adapted to perform a method of any preceding claim, and a computer program product for performing a method of any preceding claim.
Claims 2 to 20, 22 and 25 are dependent claims.

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that its characterising clause reads:

"characterised in that the series of discrimination transformations has at least three stages, each stage comprising combining feature vectors and performing discrimination transformations on the combined feature vectors to generate further feature vectors, and wherein a feature vector derived from the entire image area is combined with a feature vector derived from a central image area in the final stage of the series of discrimination transforms."

Further independent claims 19, 21 and 22 correspond to independent claims 21, 23 and 24 of the main request, respectively.

Claims 2 to 18, 20 and 23 are dependent claims.

The second auxiliary request differs from the first auxiliary request only in that in claim 1 the "discrimination transformations" are concretized to be "linear discrimination transformations".

Claim 1 of the third auxiliary request reads:

"1. A method of representing a face in a facial image by a descriptor, the method comprising the steps of:
extracting a set of component images from the image, each component image corresponding to a segment of the image;
transforming the component images into the frequency domain;
deriving feature vectors using the transformed component images in the frequency domain; and
processing the feature vectors to generate a descriptor representative of the image,
characterised in that:
said extracting step comprises extracting a set of component images comprising a whole facial image, the top and bottom halves of the whole facial image, a central facial image, and the top and bottom halves of the central facial image;
said deriving step comprises deriving:
a first feature vector using the real part of the transformed whole facial image;
a second feature vector using the imaginary part of the transformed whole facial image,
a third feature vector using the amplitude components for the transformed top half of the whole facial image;
a fourth feature vector using the amplitude components for the transformed bottom half of the whole facial image;
a fifth feature vector using the real part of the transformed central facial image;
a sixth feature vector using the imaginary part of the central facial image;
a seventh feature vector using the amplitude components for the transformed top half of the central facial image; and
an eighth feature vector using the amplitude components for the transformed bottom half of the central facial image;
said processing step comprises:
  a first stage comprising combining and performing a discrimination transformation on (i) the first and second feature vectors to generate a ninth feature vector; (ii) the third and fourth feature vectors to generate a tenth feature vector; (iii) the fifth and sixth feature vectors to generate an eleventh feature vector and (iv) the seventh and eighth feature vectors to generate a twelfth feature vector;
  a second stage comprising combining and performing a discrimination transformation on (v) the ninth and tenth feature vector to generate a thirteenth feature vector; and (vi) the eleventh and twelfth feature vector to generate a fourteenth feature vector; and
  a third stage comprises combining and performing a discrimination transformation on thirteenth and fourteenth feature vector to generate a fifteenth feature vector."

Further independent claims 11, 13 and 14 correspond to independent claims 21, 23 and 24 of the main request, respectively.

Claims 2 to 10, 12 and 15 are dependent claims.

The fourth auxiliary request differs from the third auxiliary request only in that in claim 1 the "discrimination transformations" are concretized to be "linear discrimination transformations".
VII. The arguments of the appellants, insofar as they are relevant for the present decision, are derivable from the Reasons for the Decision below.

**Reasons for the Decision**

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 99 EPC and is, therefore, admissible.

2. Procedural matters

   In view of the withdrawal of the appellants' former request for oral proceedings there was no need for the Board to hold oral proceedings or to wait with issuing a decision until the scheduled date of 24 July 2012.

   Therefore, the Board decided to cancel the said oral proceedings and to immediately continue the case in writing.

3. Main request - Article 84 EPC 1973

   3.1 The Board shares the examining division's view that the terms "discrimination transformation" and "series of discrimination transformations" are too general to be supported by the description.

   In examination, the appellants argued that the term "discrimination transformation" was well known in the art and that various types of transformations were known. The skilled person would understand the purpose of the transformations (page 2, second paragraph of the letter dated 22 May 2007).
The Board does not contest this view but considers that these terms are too vague and indefinite so as to define in a recognizable manner the measures to be taken for processing the various feature vectors. In particular, it is not clear from claim 1 how the desired "descriptor" would be obtained by means of arbitrary discrimination transformations executed on unspecified mathematical entities.

3.2 Moreover, the appellants held that the fact that the description stated that "Aspects of the invention are set out in the accompanying claims" meant that the claims are supported by the description (page 4, third paragraph of the statement setting out the grounds of appeal).

However, this purely formal statement does not qualify as a proper description of the claimed subject-matter.

In fact, the most general presentation of the invention is provided by paragraph [0016] of the published application. This paragraph, which lists a number of aspects of the invention, reads:

"[0016] In more detail, certain aspects of the invention are:

1) Use of a multi-stage architecture with three transformation stages in the Fourier Domain with the Entire and Central Features joined and mapped via D-LDA [dual-space Linear Discriminant Analysis] projection. (In the prior art Joint Fourier Vector and Central Fourier Vector are combined without mapping)
2) New set of component facial images which is simplified compared to AFRD [Advanced Face Recognition Descriptor] and yields better performance

3) Use of a better suited linear mapping called dual-space LDA as opposed to PCA-LDA [Principal Component Analysis-LDA] transform used in the AFRD

4) Use of different frequency components in the Fourier spectrum. In addition to low-horizontal and low-vertical frequency components used by both the AFRD and the invention, the AFRD is also scanning high-horizontal and low-vertical components, while the proposed invention uses low-horizontal and high-vertical components. As a consequence, the proposed invention is more sensitive to vertical facial features, which have superior inter-personal discriminating power and less sensitive to face localisation errors in horizontal direction."

No indication is provided in the description that the invention may be generalised beyond these specific aspects.

In contrast, the definitions of claim 1 are much more general and, in fact, do not specify any of these aspects. The description therefore does not provide support for a method defined in the general terms of claim 1.

3.3 Finally, claim 1 does not define the complete framework within which the invention would make technical sense nor does it indicate all those features which are essential to the solution of the problem underlying the invention.

According to the appellants, the problem addressed by the present invention was the aim to reduce the amount of processing required for the image processing without
compromising the distinctiveness of the resultant descriptor (see page 3, penultimate paragraph of the statement setting out the grounds of appeal).

However, adding further stages to known single-stage or two-stage processes of discrimination transformations, as defined in the characterizing clause of present claim 1, actually increases the computational effort and thus does not constitute a legitimate solution to the problem posed. This is all the more true, as the technical effect of additional stages of discrimination transformations isolated from other measures (such as for instance the choice of a specifically suitable transformation algorithm (ie Dual-LDA) remains obscure.

3.4 Although having been informed about the above deficiencies by the Board's communication annexed to the summons to oral proceedings of 16 March 2012, the appellants did not present any comments nor propose any amendments.

4. Auxiliary requests – clarity

In its communication of 16 March 2012 the Board expressed its doubts that claim 1 of each of the first to fourth auxiliary requests defined a complete solution to the problem posed. In particular, the Board considered it unlikely that any number of arbitrary discrimination transformations (even if they are linear) could achieve a satisfactory solution to the problem of obtaining adequate descriptor quality when operating on feature vectors derived from a reduced number of Fourier transformed image segments. Claim 1 of each of the auxiliary requests therefore lacks the essential features necessary to solve the problem.
The appellants did not comment on this issue either, and the Board has no reason to discard its objections.

5. Consequently, none of the appellants' requests on file is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar      The Chairwoman

R. Schumacher      F. Neumann