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Datasheet for the decision of 13 July 2021

Case Number: T 2593/16 - 3.5.06

Application Number: 11177890.8

Publication Number: 2428916

IPC: G06K9/46, G06K9/00, G06K9/62

Language of the proceedings: EN

Title of invention:
Method and apparatus to generate object descriptor using extended curvature gabor filter

Applicant:
Samsung Electronics Co., Ltd.

Headword:
Curvature Gabor filters/SAMSUNG

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no) - effect not made credible within the whole scope of claim

Decisions cited:
T 0641/00, T 1294/16

Catchword:

Europäisches Patentamt
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Case Number: T 2593/16 - 3.5.06

D E C I S I O N
of Technical Board of Appeal 3.5.06
of 13 July 2021

Appellant: (Applicant)	Samsung Electronics Co., Ltd. 129, Samsung-ro Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 (KR)
Representative:	Grootscholten, Johannes A.M. Arnold & Siedsma Bezuidenhoutseweg 57 2594 AC The Hague (NL)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 13 July 2016 refusing European patent application No. 11177890.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Müller
Members:	T. Alecu
	A. Jimenez

Summary of Facts and Submissions

I. The appeal is against the decision of the Examining Division to refuse the application.

II. The appellant requests to set aside the decision of the Examining Division and to grant a patent on the basis of the main request or one of two auxiliary requests, all filed with the grounds of appeal. The main request is based on the first auxiliary request refused by the Examining Division (for a lack of inventive step), the first auxiliary request is based on the second auxiliary request in the impugned decision (found to be in breach of Articles 84 and 123(2) EPC), whereas the second auxiliary request is based on the third auxiliary request in the impugned decision (found to lack an inventive step and to be in breach of Article 123(2) EPC), with amendments.

III. The appellant initially requested also (conditionally) oral proceedings. The Board issued summons to oral proceedings and informed the appellant of its provisional opinion, which was that all requests lacked inventive step, and that clarity issues were also present. The request for oral proceedings was withdrawn with the letter of 13 July 2021, and the oral proceedings were subsequently cancelled.

IV. Claim 1 of the main request defines:

A method of generating an object descriptor, comprising:

extracting, by a computer, gabor features from an input object image by applying a plurality of curvature gabor filters, consisting of a combination of a

plurality of filters of the same curvature and mutually different Gaussian magnitudes and a plurality of filters of mutually different curvatures and the same Gaussian magnitude, to the object image; and

generating, by a computer, an object descriptor for object recognition by projecting the extracted features onto a base vector generated through linear discriminant analysis learning,

wherein the filters consist of:

three pluralities of filters having the Gaussian magnitude σ= {0.5π, π, 2π} based on the curvature c={0.0}; and

three pluralities of filters having the Gaussian magnitude σ={π} based on the curvature c={0.05, 0.1, 0.2}.

V. Claim 1 of the first auxiliary request differs from that of the main request in that it recites the curvature Gabor filters formula as per the description, equation 5, with the corresponding value definition just below it, and in that it further specifies the parameters of the filters as follows

wherein
c = {0.0,0.1} [...]; and
[...],
wherein small filters corresponding to v = {-2, -1} are added to v = {0,...,4}.

VI. Claim 1 of the second auxiliary request differs from that of the first auxiliary request in that it specifies the parameters as follows

wherein c = 0.0, μ = {0,...,7}, and v = {-2,-1,0,⋯,4} or wherein c = 0.1, μ= {0,⋯,15}, and v = {-2,-1,0,⋯,4};.

Reasons for the Decision

The application and the prior art

1. The application relates to a method of generating image object descriptors using curvature Gabor filters (page 1, 1st paragraph, equations 3 to 5 on pages 9-10), in particular for face recognition (pages 1 and 2). It proposes some specific selections of sets of parameters for the filters, which are said to reduce the computational burden but still achieve predetermined recognition rates (page 2, 3rd paragraph from the top, figures 2A-B and 3A-C, corresponding description on pages 10 and 11). From among those filters a further selection is made using boosting, and a linear discriminant analysis (LDA) projection is used to define the discriminant space for recognition by e.g. normalized correlation (see figure 5).

2. Document D1 (US 2009/0028444) is from the same applicant and describes essentially the same method (paragraphs 3 to 15, 41-52, 65, 72). D1 does not provide specific examples of parameterizations of full sets of curvature Gabor filters to be used in a specific context.

Inventive step - Article 56 EPC

3. It is common ground (see the statement of grounds of appeal, page 2) that claim 1 of the main request differs from D1 by stating that

the filters consist of:

three pluralities of filters having the Gaussian magnitude σ= {0.5π, π, 2π} based on the curvature c={0.0}; and

three pluralities of filters having the Gaussian magnitude σ={π} based on the curvature c={0.05, 0.1, 0.2}.

4. The Examining Division deemed the request to lack inventive step (points 14.3 and 13.3, 13.4 by back-reference), the choice of filters being obvious as the result of a normal design procedure: "*[t]he parameters defined in claim 1 are a straightforward choice of parameters that a person skilled in the art would choose when implementing the teachings of D1*", pointing to figures 2A-B and 3A-C of D1 (13.3).
They also stated (13.3) that "*the discretisation chosen does not properly define anything as the parameters need to be tailored to a specific context (i.e. object size, image resolution, etc.) which is not defined. The choice is arbitrary [...]*".

5. The appellant disagrees (pages 3 and 4 of the grounds of appeal) because the filters with the chosen parameters would *solve the objective technical problem* of *how to reduce the calculation time without losing a certain face recognition rate* and *are not anticipated by D1*. In particular, no values for *σ* or *c* other than c=0 and *σ*=2π are specified in D1, and D1 teaches to use more filters (paragraph 36), so it does not hint to this solution.

6. The Board agrees with the Examining Division that claim 1 lacks inventive step.

6.1 D1 provides for a family of (mathematically formulated) filters that can be adapted to every object size and image resolution by choosing the appropriate filter scale by the parameter σ, and to the object shape patterns by e.g. the parameter c. The skilled person would employ these filters to provide object descriptors for specific problems (e.g. face recognition in an airport implying an expected face size and image resolution), none of which is however claimed.

6.2 When doing so, the skilled person needs to perform the said adaptation; depending on the object and image characteristics, the selected filters will be different. No set of selected filters will be beneficial, in the sense of providing the desired accuracy and computational efficiency, for all objects and images.

6.3 The application does not link the claimed choice to a specific dataset on which it would be beneficial. Even if it would, the claims do not specify any image or object characteristics, which means that, when considering the said breadth of the claim, for most datasets this choice is not beneficial. Consequently, the claimed parameterization does not predictably bring about a technical effect over a reasonable extent of the claim, which means that the filters cannot be said to contribute towards providing a technical solution to a concrete technical problem; the mere possibility that a technical effect is present for some subset of the claimed matter is not sufficient (T 1294/16, points 25 and 26.2). The claimed selection of specific filter parameters can therefore be disregarded when assessing

inventive step (T 0641/00, point 6), which means that no inventive step can be acknowledged over D1.

Auxiliary requests

7. The auxiliary requests differ from the main request only in that they propose a different selection of filter parameters. This does not change the reasoning above, because in the absence of the specification of the dataset characteristics no technical effect can be acknowledged.

8. The Board concludes that claim 1 of the first auxiliary request and claim 1 of the second auxiliary request lack inventive step as well (Article 56 EPC).

Other issues

9. There were other issues pending in the appeal procedure, namely clarity and added subject matter. Given the conclusion reached on inventive step, there is no need to decide on these other issues.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Stridde M. Müller

Decision electronically authenticated