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D E C I S I O N
of 25 June 1996

Case Number: T 0183/95 - 3.5.1

Application Number: 91909688.3

Publication Number: 0527895

IPC: G06K 9/66

Language of the proceedings: EN

Title of invention:

Neutral network with back propagation controlled through an output confidence measure

Applicant:

EASTMAN KODAK COMPANY

Opponent:

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Headword:

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Relevant legal provisions:

EPC Art. 56, 109, 111(1)
EPC R. 67

Keyword:

"Inventive step against citation on which decision of refusal was based (yes) - claims amended by insertion of feature considered in the decision to be unobvious"
"Remittal for further prosecution"
"No refund of appeal fee - refusal to rectify decision not procedurally manifestly wrong"

Decisions cited:

-

Catchword:

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Boards of Appeal

Chambres de recours

Case Number: T 0183/95 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 25 June 1996

Appellant: EASTMAN KODAK COMPANY
343 State Street
Rochester
New York 14650-2201 (US)

Representative: Schmidt, Peter, Dipl.-Ing.
KODAK Aktiengesellschaft
Patentabteilung
70323 Stuttgart (DE)

Decision under appeal: Decision of the Examining Division of the European Patent Office posted 21 October 1994 refusing European patent application No. 91 909 688.3 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: W. B. Oettinger
C. Holtz

Summary of Facts and Submissions

I. The appeal contests the examining division's decision to refuse the European patent application No. 91 909 688.3 filed, as an international (PCT) application, on 1 May 1991.

II. The reason given for the refusal was that the subject-matter of the independent apparatus and method claims 1 and 14, respectively, filed on 6 November 1992 did not involve an inventive step, having regard to prior art document

D1: US-A-3 548 202.

In effect the same conclusion was drawn for the dependent claims 2 to 13 and 15 to 24.

III. The independent claims then on file read as follows (with a purely clerical error corrected and some repeated reference numerals omitted):

"1. An apparatus for recognizing the existence of a plurality of patterns in unknown input data, using a neural network (200) having an inter-connected hierarchy consisting of input (220), hidden (230) and output layers (240) formed of different neurons with pre-defined pairs of said neurons being inter-connected with a corresponding numeric weight (225, 235) associated therewith; and wherein each of said neurons has a neural output value (375) provided as a thresholded function (373) of a neural input ($310_1, 310_2, 310_3, \dots 310_n$) and the actual output values of said output layer are provided over leads (250) to means (260) responsive to said plurality of output values, and additionally

responsive to predefined target output values, current neural weights and bias values, said apparatus being characterized by:

means (260) responsive to a control signal applied over lead (450) for adjusting the value of each of said neural weight while said unknown input data is applied to said network means (400) so as to reduce error arising between said output values (481, 482, 483, ...) and the output target values (263) for the unknown input data;

means (410) additionally responsive to said plurality of output values for determining a confidence measure associated therewith; and

means (430, 440) responsive to said confidence measure, for generating said control signal so as to enable said determining and adjusting means (260, 270) during pattern recognition to determine said changes and adjust the values of said weights, when said confidence measure has a numeric value lying within a pre-defined numeric range so that network training does not occur during pattern recognition whenever the confidence measure associated with the output values produced for said one pattern is either greater or less than said numeric value whereby said network means (200, 400) is trained to recognize said pattern in the event the pattern deviates from a pre-defined pattern."

"14. A method for recognizing ... [preamble defining essentially, although not literally, the same functions as does the preamble of claim 1], said method being characterized by the steps of:

determining ... [step defining essentially, although not literally, the same function of means (260) as does the characterizing part of claim 1];

determining ... [step essentially identical with the function of means (410) as defined in claim 1]; and

generating ... [step essentially identical with the function of means (430, 440) as defined in claim 1]."

- IV. It was however mentioned, in the decision under appeal, that the afore-mentioned conclusions did not apply to method claim 25; rather, this claim was considered to be based on a non-obvious advantage.

That claim referred back to claim 22 referring back to claim 21 which referred back to claim 14, and it specified the respective method as "comprising successively executing the pattern recognition step twice for each page of an input document being recognized so as to improve recognition accuracy for that page".

- V. The appeal was lodged, and the respective fee paid, on 21 December 1994.

The notice of appeal contains no substantive request but a request for reimbursement of the fee "in case of an interlocutory revision".

On 11 February 1995, the appellant filed a statement of grounds.

- VI. Together with the latter statement, the appellant filed new independent apparatus and method claims 1 and 14, respectively, and dependent claims 2 to 13 and 15 to 24.

The independent claims differ from the previous ones (cf. III) essentially, i.e. apart from inessential modifications in wording, by a different two-part form of claim 1 (the first characterising feature was transferred to the preamble) and by the characterizing part of claim 1 being supplemented by the following feature:

"means (170) for utilizing the confidence measure to flag the pattern that have been recognized with a low confidence measure to be reclassified during a second pass through the network means."

and the characterizing part of claim 14 being supplemented by the following feature:

"executing in accordance with the confidence measure the pattern recognition twice for each page of an input document being recognized so as to improve recognition accuracy for that page."

Furthermore, the appellant filed a new description page 5. For the other application documents on file, reference is made to paragraph IV of the decision under appeal.

VII. For support of the feature added to claim 1, the appellant referred to the description (page 25 lines 15 to 19).

For support of the feature added to claim 14, he referred to previous claim 25.

- VIII. The statement of grounds contains a (main) request that the decision under appeal be set aside and a patent be granted on the basis of these claims and an (auxiliary) request ("merely if the Board cannot accept the amended claims") for a "hearing".
- IX. In support of his main request, the appellant referred to the examining division's positive attitude (cf. IV) towards claim 25 then on file.

Reasons for the Decision

1. The appeal (cf. V) is admissible.
2. The appellant's request for reimbursement of the appeal fee in the event of interlocutory revision cannot be granted under Rule 67 EPC, first half sentence, since the examining division did not rectify its decision.
 - 2.1 However, a refund of the appeal fee may be ordered under Rule 67 EPC, second half sentence, if the appeal is allowed and the Board finds this equitable by reason of a substantial procedural violation.

According to decision T 647/93, OJ 1995 132, such a violation justifying a refund occurred when the first instance did not make use of the possibility of granting interlocutory revision under Article 109 EPC. In that case the first instance had mistakenly overlooked that the claim as submitted by the applicant corresponded to suggestions by the first instance, deciding on a slightly differently worded claim. On the other hand, in T 536/92, of 29 November 1993, the Board decided not to refund the appeal fee, since there was room for

interpretation as to whether or not the amendments made on appeal did indeed overcome the objections made by the first instance.

The present case appears parallel to that of T 536/92 in that, for instance, the examining division might have felt, in view of the particular back-references of previous claim 25, unconvinced by the submissions intended to support the new independent method claim 14 (VII, IX). Or it might not have been convinced by the submissions intended to support the new independent apparatus claim 1 (VII, IX). As another envisageable reason, the division might have considered that the appellant's request, worded as it is (V), would imply that, if the division intended to reject the request for reimbursement, it would for this reason have been barred from interlocutory revision. Even if all these possible reasons would turn out not to be valid, they would still be lying within the discretion the examining division has when considering whether the appeal is "well founded". The remittal of the appeal to the Board therefore cannot be said to have been procedurally manifestly wrong.

The Board does not, therefore, consider reimbursement of the appeal fee to be equitable, and such reimbursement will not be ordered.

3. In the Board's view, the amendments made to the independent claims are such as to remove the reason given, in the decision under appeal, for the refusal of the application.

More particularly, this conclusion is based on the following considerations:

3.1 The Board is satisfied that the amendment made to claim 14 by the inclusion of the feature "executing ..." (cf. VI) does restrict the subject-matter of this claim to the same extent as the feature "comprising successively executing ..." of previous claim 25 restricted the claim to which it referred (cf. IV).

3.2 In the decision (paragraph 4.2), said feature was said to give rise to the "non-obvious advantage of a double-pass technique in the context of selective unsupervised learning i.e. drift identification and correction on the first pass providing an improved basis for recognition on the second pass" and to be "more than a simple repeat attempt".

This is understood as meaning that the examining division was of the opinion that the added feature, and consequently the subject-matter of a claim containing it, was not obvious to a skilled person reading D1 with normal knowledge of this technical field.

3.3 The Board sees no reason for disputing this finding.

3.4 The Board therefore concludes that the method now claimed is not obvious to the skilled reader of D1.

3.5 The amendment made to claim 1 is clearly, although differently worded, of the same kind as that of claim 14 (cf. 3.1).

3.6 All the above conclusions (3.2 to 3.4) will therefore be the same for the apparatus claim.

3.7 For these reasons (3.4, 3.6), the claimed subject-matter has to be regarded as involving an inventive step having regard to D1.

4. The issue of lack of inventive step against D1 is, as a consequence of the reason given in the decision under appeal for the refusal of the application, the only substantive issue to be decided in the present case.

In the particular circumstances of the present case, the finding of an inventive step (3.7) leads the Board to the following conclusions:

4.1 For the reasons stated, the reason for refusal of the application is considered to be removed.

4.2 The appellant's request that the decision under appeal be set aside is therefore allowable.

4.3 This does not necessarily mean that claims 1 and 14 meet **all** requirements of the Convention and that they are, for this reason, allowable.

As a particular point, it is noted that claim 14 does not include the features defined in previous claims 22 and 21 to which claim 25 referred back. The fact that the subject-matter of claim 14 is thus defined by a combination of features which was not claimed in the previous statement of claims is not **per se** objectionable; but it would seem to suggest that possibly the subject-matter of claim 14 was not claimed in the original statement of claims as well. If this was the case, it could still be that support for the subject-matter of claim 14 can be found in the original description, but until now this has not been looked into. So, claim 14 cannot presently be said to have been examined in respect of Article 123(2) EPC.

Mutatis mutandis the same would apply to claim 1.

- 4.4 Even in the event that the amendments made to the independent claims will turn out to be admissible, or that further amendments would render them admissible, their allowability might still depend on their meeting other requirements such as set out in Article 84 and Rule 29 EPC and, moreover, the dependent claims and the description as on file might require some attention.

For all these reasons, in particular the one mentioned before (4.3), the Board finds it appropriate not to take a final decision on the appellant's request for grant of a patent but to remit the case to the examining division for further prosecution on the basis that the claims are no longer objectionable for the reason for which the previous claims were rejected as unallowable in the decision under appeal.

- 4.5 The appellant's auxiliary request for a "hearing" (cf. VIII) is interpreted as a request for oral proceedings (Article 116 EPC).

Furthermore, the Board interprets the condition under which this request is to be considered as meaning "if the Board cannot accept the amended claims" as meeting the objection for which the previous claims were rejected in the decision under appeal.

Since, in this sense, the Board considers the claims on file to be acceptable, the auxiliary request needs not to be considered.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance department for further prosecution on the basis of the claims filed on 11 February 1995 and the other application documents as on file (cf. VI).
3. Reimbursement of the appeal fee is refused.

The Registrar:

The Chairman:

M. Kiehl

P. K. J. van den Berg