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D E C I S I O N
of 21 October 1999

Case Number: T 1025/97 - 3.5.1

Application Number: 92116021.4

Publication Number: 0533195

IPC: H04N 7/133

Language of the proceedings: EN

Title of invention:
Picture signal encoding and/or decoding apparatus

Applicant:
Sony Corporation

Opponent:
-

Headword:
Picture Signal Encoding/SONY CORPORATION

Relevant legal provisions:
EPC Art. 84

Keyword:
"Clarity - new claim 1 - (yes)"
"Remittal for further prosecution"

Decisions cited:
-

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1025/97 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 21 October 1999

Appellant: Sony Corporation
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 28 May 1997 refusing European patent application No. 92 116 021.4 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: R. Randes
V. Di Cerbo

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division to refuse the application on the ground that the subject-matter of claim 1 did not meet the requirements of Article 84 EPC. Inter alia the following documents were cited in the decision:

D1: EP-A-0 248 711

D2: Electronic Letters, vol. 26, No. 5, 1 March 1990, pages 276 to 277; HSIEH et al.: 'Motion estimation algorithm using interblock correlation'.

II. The appellant (applicant) lodged an appeal against the decision and paid the prescribed fee. The subsequently filed statement of grounds of appeal contained a new set of claims 1 to 21. A request for reimbursement of the appeal fee was filed as well as an auxiliary request for oral proceedings.

III. Following a communication from the Board pursuant to Article 11(2) of the RPBA, the appellant filed new claims 1 to 12 and description pages 1 to 45 of a main request and new claims 1 to 9 and new description pages of an auxiliary request. The oral proceedings were cancelled in accordance with appellant's letter, filed on 18 August 1999. The appellant stated therein (cf. under paragraph IV at the end of the letter) that oral proceedings might become superfluous, if the Board considered that no (or only minor) amendments were necessary to bring the application "into a consideration for allowance". The appellant requested that the decision under appeal be set aside and a

patent granted on the basis of the following documents:

Main request:

Claims: 1 to 12, received on 16 August 1999;

Description: pages 1 to 45, received on 16 August 1999;

Drawings: sheets 1 to 19, as originally filed.

First auxiliary request:

Claims: 1 to 9, received on 16 August 1999;

Description: pages 1 to 45, received on 16 August 1999;

Drawings: sheets 1 to 19, as originally filed.

In a **second auxiliary request** the appellant declared himself ready to revise the description and the drawings such that the parts relating to what is referred to in the description as the "first embodiment" and the "third embodiment" were cancelled.

IV. Claim 1 of the main request reads as follows:

"A picture signal encoding apparatus for encoding a picture signal on a block-by-block basis comprising orthogonal transform means (22), means (23) for quantizing the transformed data and means (24) for encoding the quantized data, the apparatus furthermore

comprising:
a local decoding means (27,28) for locally decoding said quantized data,
a motion detecting means (30,31),
a motion compensating means (32) for producing a predictive picture by motion compensating on the basis of output information from said means for orthogonal transforming and said motion detecting means (31), and
a difference data means (21) for computing difference data between said predictive picture produced by said motion compensating means (32) and an original picture signal corresponding to said predictive picture,
wherein said motion detecting means comprises means for dividing a block under consideration for motion compensation into at least four subblocks (A, B, C, D) and for calculating motion vectors (VA, VB, VC, VD) of said subblocks (A, B, C, D),
characterized in that
said motion detection means further comprises
means for calculating difference vector data (VAB, VAC, ..., VCD) from said motion vectors,
means for classifying said difference vector data (VAB, VAC, ..., VCD) and means for generating based on the result of the classification a representative vector to be used when motion compensating and when encoding the quantized data."

In independent claim 5 of the main request, the feature in the pre-characterising portion of dividing a block into at least four subblocks is missing and the characterising portion is replaced by:

"said motion detecting means further comprises
a difference data extracting means (51) extracting a

difference motion vector information by comparing the motion vector of a target block (X) under consideration with the respective motion vectors of at least neighbouring blocks preceding said target block and a processing means (52, 53) classifying said motion vector data and/or said further difference vector information as to equality and code length, selecting the motion vector data of a neighbouring block if there is equality, at least within prescribed limits, and if not the difference vector information having the shortest code length, and
means for generating a representative information based on the selection result to be used when motion compensating and when encoding the quantized data."

Independent method claim 11 corresponds essentially to apparatus claim 1.

Claim 12 reads as follows:

"A recording medium being recorded with an encoded picture signal encoded according to the method of claim 11 or encoded by an encoding apparatus as set forth in anyone of claims 1 to 6."

The claims of the auxiliary request correspond to those of the main request with the exception that claims 5 and 6 of the main request have been deleted.

IV. The appellant argued as follows:

The invention concerned a motion detecting means for a picture encoding apparatus such as that disclosed in D1. The central aspect of the invention was the

calculation and judgement of the difference vector data from the motion vectors of the subblocks. Even if it were obvious from D2 to calculate difference vector data and to choose the most appropriate difference vector, the claimed processing was not described or rendered obvious.

The reimbursement of the appeal fee was justified for three main reasons.

Firstly, the refusal was completely surprising, because in the single communication the examiner stated that in view of the formal objections no complete examination could be carried out. This could also be deduced from the fact that the examiner only gave a tentative opinion on inventive step, using the word "appears". The applicant therefore had no opportunity or reason to present arguments on inventive step.

Secondly, the statement at page 7, lines 2 to 9 of the decision that the feature of "generating information representing a representative motion vector" was not in an independent claim, was wrong, since that feature was present in claim 1. As a result, the applicant's arguments about this feature were not commented on in the decision, so that the decision was not sufficiently reasoned.

Thirdly, the ground for refusal under Article 84 EPC mentioned in paragraph 11 of the decision was a further ground of refusal, since paragraph 2 of the decision stated that the clarity objection had been met.

Reasons for the Decision

1. The appeal is admissible.

2. *The application*

2.1 The application relates to the well known technique of motion compensated predictive coding. In predictive coding the picture to be coded is predicted on the basis of the previous (reference) picture and only the difference is coded. Motion compensation comprises two steps. Firstly, motion estimation determines how much the picture to be encoded has moved relative to the reference picture. A motion vector for a pixel block is calculated which represents the motion for the block. Secondly, the motion compensation adjusts the block in the reference picture according to this calculated motion vector so that the difference between the picture to be coded and the reference picture will be smaller, which results in less data to be coded. The coding step uses a discrete cosine transform, zig-zag scanning of the coefficients and variable length coding.

2.2 The application contains various aspects and embodiments of which the fourth aspect or second embodiment, described in the published application at page 3, lines 4 to 11, page 7, line 46 to page 10, line 22 and Figure 13, is claimed in claim 1. In this embodiment, the 8 by 8 (pixel) block is divided into four 4 by 4 (pixel) subblocks (see Figure 14). A motion vector is calculated for each subblock (V_A,V_B,V_C,V_D). The four differences are formed between each combination of the four motion vectors. Each difference is compared

with a threshold which effectively determines which motion vectors are similar to each other. If all the differences are lower than the threshold, this means that the motion vectors of the subblocks are similar and can be represented by a single vector, called the representative vector. This is pattern PT1 in Figure 15. If the motion vectors of the blocks A and B are similar to each other and so are those of C and D, the pairs being different, the block is classified as pattern PT2. This requires two representative motion vectors. Various other classification patterns are possible. The seven classifications are given in Table 1 in Figure 16 which give rise to the seven codes given in Table 2 in Figure 17. The appropriate code is added to the encoded picture data in a multiplexer.

2.3 The technique of the third embodiment (see page 10, line 23 onwards in the published application) reduces the amount of motion vector information which is transmitted by relating a current motion vector to a previous motion vector in what is essentially a prediction encoding of motion vectors. One motion is calculated for each block (see Figure 21). If the motion vector of the current block is similar to a motion vector of a previous block (X_A, X_B, or X_C), this is indicated by a particular code (see Figure 22). Only this code is transmitted and not the motion vector (see page 10, lines 52 to 56). If the current vector is not similar to any of the chosen reference vectors, the smallest of the vector itself and any of the difference vectors with respect to the reference vectors is transmitted with an appropriate identification code.

2.4 The first embodiment (see page 5 to page 7, line 45 and

Figure 1) in the published application is completely different and has nothing to do with motion compensation (compare Figures 1 and 13). Here the idea is to reduce the quantity of encoded data by increasing the number of coefficients that are zero after the zig-zag scanning step (see page 5, line 53). This is done by dividing the blocks into 4 subblocks (see Figure 2A) and determining which subblocks are flat, ie. have no significant variation in pixel data within the subblocks. The pixel data of subblocks which are not flat are symmetrically reflected into the flat ones (see Figures 2, 3, 5, 7 and 8). A property of the transformation is that the transform of such symmetrical blocks contains columns or rows of zeros (see Figures 4, 6 and 9). A modified zig-zag scanning (see Figure 10B) results in a greater run of zero coefficients and hence more efficient coding. An indication of the flatness of the subblocks is multiplexed with the image data and is used by the decoder to work out which data has been reflected so that the block can be restored to its original content.

3. *The decision under appeal*

3.1 The refused claim 1 related to the above-mentioned second embodiment.

3.2 The last paragraph of the decision under appeal gives the reason for the refusal as "the absence of an allowable set of claims (Articles 84 and 52)", thereby giving the impression that the application was refused separately under Article 84 EPC and Article 52 EPC. However, in the Board's judgement, it is apparent from the various partially overlapping objections in the

decision, mentioning result to be obtained (paragraph 3), unclear terms (paragraph 4), vague and general expression (paragraph 5), and functional terms (paragraph 8) that claim 1 according to the examining division's opinion did not meet the requirements of Article 84 EPC. In particular, the feature of the "pattern forming means", which was used to claim the processing of the difference vectors described above, represented a result to be achieved and, therefore, did not properly define the matter for which protection was sought as required by Article 84 EPC.

3.3 In the Board's opinion, the reasoning in the decision concerning inventive step was merely an indication that the examining division saw no immediate prospect of granting a patent. This was given to indicate that even if the objection under Article 84 EPC were overcome by amendment, it would not necessarily lead to an allowable claim. It is, therefore, clear that the decision does not consider lack of inventive step as a ground for refusal.

4. *Reimbursement of appeal fee*

4.1 The above-mentioned slightly confusing nature of the decision appears to result from the examining division's apparent difficulty in articulating the objection under Article 84 EPC. This however is a substantive and not a procedural matter.

4.2 The fact remains that an objection under Article 84 EPC had been communicated to the applicant, albeit in a rather brief form, in the communication from the examining division. Moreover, the applicant had taken

the opportunity to comment on the objection. It is clear however from the end of paragraph 8 of the decision under appeal that the examining division had considered the applicant's arguments but was not convinced by them.

4.3 It is true that the application was refused after only a single communication and that the applicant had made a number of amendments to the claims. However the only amendment that was made in response to the objection under Article 84 EPC to the feature of the "pattern forming means" was to change the words "for generating information on a pattern of" to "for generating pattern information representing". This was accompanied by the argument that, in the applicant's opinion, this functional formulation should have been allowable. In the Board's judgement, it is apparent that this response has not overcome the examining division's objection.

4.4 In the Board's judgement, no procedural violation occurred in this sequence of events that could lead to a reimbursement of the appeal fee under Rule 67 EPC.

5. *Amendments*

5.1 During the appeal proceedings, the appellant has made several amendments to claim 1. Firstly, the claim now explicitly states that the motion detection means calculates motion vectors for the subblocks and calculates difference vector data from these motion vectors. Secondly, the feature of the "pattern forming means" has been replaced by the features of classifying the difference data and generating a representative

vector for motion compensation based on the result of the classification.

5.2 The Board finds that these amendments are supported by originally filed claim 2, which deals with the difference vectors and the representative vector, and the originally filed description. Although the word "classifying" is not explicitly mentioned, the Board judges that it is derivable from the "judging" of the pattern of the difference vectors disclosed at page 8, line 37 in the originally filed description. Moreover, the description, at page 10, lines 14 to 19 states that the selection of the block pattern is not limited by the details of the embodiment.

6. *Clarity of claim 1*

6.1 Claim 1 of both main and auxiliary requests now contains the features "means for classifying said difference vector data" and "means for generating based on the result of the classification a representative vector to be used when motion compensating and when encoding the quantized data".

6.2 The Board has considered these features in the light of the examining division's various objections under Article 84 EPC. From a linguistic point of view the features are clear. The features do not claim a result to be achieved because no result, such as reducing the quantity of motion vectors, is actually mentioned in the claim. The features are not vague, but are certainly general, since classifying could be achieved in a number of ways. However, broadness of a claim in itself is not prohibited under Article 84 EPC, provided

the claim is supported by the description. In the Board's judgement, the general idea of calculating and classifying the difference vectors in subblocks is supported by the discussion of the embodiment in the description, essentially for the same reasons given above in connection with the allowability of the amendments. It is true that the features are functional, since the actual details of how the classification and generating is performed, eg. by the use of the tables in Figures 16 and 17, are not given. However, functional features are also not in themselves objectionable if the skilled person could implement them. The Board again judges that, in the present case, the skilled person would be able to implement means to classify the difference vectors and generate a vector which represents them.

6.3 It must be remembered, of course, that for the purposes of evaluating novelty and inventive step, the claims must be interpreted in their broadest sense.

6.4 In the Board's judgement therefore claim 1, and the corresponding method claims, of both requests meet the requirements of Article 84 EPC.

7. *Further examination*

7.1 It follows from the above that, in the Board's judgement, the examining division did not fully consider the issue of inventive step. Moreover, the set of claims of the main request has now been amended and includes additional independent claims and also amended and new dependent claims (cf. appellant's letter, filed on 16 August 1999, page 2). The Board therefore judges

that it is appropriate to remit the case to the examining division for further prosecution.

7.2 In particular, the claims should be examined to see if their general subject-matter involves an inventive step over the prior art. The Board notes that the appellant states at page 4, paragraph 2 of the last letter of reply that "it seems not necessary to include further features into the independent claims such as those of claims 2 and/or 3 or of claims 6 or even Figure 22, respectively". The correctness of this statement should be examined.

7.3 As a result of an objection from the Board against the combination of the subject-matter of the second and third embodiments, the main request now has two independent apparatus claims; claim 1 directed to the second embodiment and claim 5 directed to the third embodiment.

7.4 It appears to the Board that claim 5 of the main request is prima facie clear and supported by the description. However, the claim is not the same as the originally filed independent claim 8 which was directed to the third embodiment. This new claim 5 must therefore also be examined in respect of all requirements of the EPC, in particular for unity with claim 1. Since according to Article 82 EPC, unity relies on an inventive element between the claims, the Board judges that this examination should be carried out by the examining division which has anyway to examine the claims for inventive step.

7.5 The Board notes that both requests contain a new claim

to a recording medium. The patentability of this claim should be examined.

7.6 The amendments to the description should also be examined. In particular, whether the description of the first and/or third embodiment should be deleted as suggested in the appellant's second auxiliary request.

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 for further prosecution.

3. The request for reimbursement of the appeal fee is refused.

The Registrar: The Chairman:

M. Kiehl P. K. J. van den Berg