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**Datasheet for the decision
of 25 June 2009**

Case Number: T 1149/05 - 3.5.04

Application Number: 97907276.6

Publication Number: 0827342

IPC: H04N 7/24

Language of the proceedings: EN

Title of invention:

Encoder, decoder, their methods, and image processor

Applicant:

mitsubishi denki kabushiki kaisha

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 123(2)

Relevant legal provisions (EPC 1973):

EPC Art. 84

Keyword:

"Claims-support by description (main request: no)"
"Claims-support by description (auxiliary request:yes)"
"Added subject-matter (auxiliary request: no)"

Decisions cited:

-

Catchword:

-



Case Number: T 1149/05 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 25 June 2009

Appellant:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 22 February 2005
refusing European application No. 97907276.6
pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: F. Edlinger
Members: A. Dumont
T. Karamanli

Summary of Facts and Submissions

- I. The appeal is directed against the decision by the examining division to refuse European patent application 97907276.6, published in accordance with Article 158(3) EPC 1973 as EP 0 827 342 A1.
- II. The application was refused on the ground that the subject-matter of the independent claims according to the requests then on file lacked support by the description (Article 84 EPC 1973). The examining division further found that claim 1 according to the second auxiliary request then on file infringed Article 123(2) EPC.
- III. With the statement of grounds of appeal (dated 22 June 2005) the appellant filed *inter alia* a set of claims 1 to 10 according to a main request.
- IV. In a communication sent in preparation for the oral proceedings the board informed the appellant that oral proceedings concerning the three cases T 1149/05, T 497/05 and T 1558/07 (the parent application and two divisional applications, respectively) would be held jointly on three consecutive days.
- V. With a letter dated 25 May 2009 the appellant filed a set of amended claims 1, 4, 7 and 9 of a main request.
- VI. Oral proceedings were held on 23, 24 and 25 June 2009 jointly in the three cases T 1149/05, T 497/05 and T 1558/07. The debate on the present case took place on 23 June 2009 and the decision was given on 25 June 2009.

In the oral proceedings the appellant filed a first auxiliary request comprising claims 1 to 10.

VII. Before the closure of the debate the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request comprising claims 1, 4, 7 and 9 filed with the letter dated 25 May 2009 and the dependent claims 2, 3, 5, 6, 8 and 10 of the main request filed with the letter dated 22 June 2005, and a description to be adapted.

Alternatively, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the first auxiliary request comprising claims 1 to 10 filed in the oral proceedings, and a description to be adapted.

VIII. Claim 1 according to the main request reads as follows:

"An encoding apparatus (400), comprising:

a picture element memory (1) for receiving and storing a value of an encoding picture element to be encoded, and for outputting values of encoded picture elements adjacent to the encoding picture elements as values of reference picture elements;

a mode determinator (2) for determining one of a specific encoding mode and an encoding mode other than the specific encoding mode from a plurality of predefined encoding modes for the encoding picture element;

a first encoding section (101) for predicting the value of the encoding picture element, determining a prediction result whether the prediction is correct or not, encoding the value of the encoding picture element based on the prediction result of the determination, and for outputting a codeword representing the encoding picture element under the determined specific encoding mode;

a second encoding section (102) for predicting the value of the encoding picture element, encoding the value of the encoding picture element, and for outputting a codeword representing the encoding picture element under the encoding mode other than the specific encoding mode;

an encoding controller (11) for selectively operating the first encoding section and the second encoding section based on a determined encoding mode of the mode determinator (2),

wherein the first encoding section (101) comprises:
a first predictor (3) for calculating a prediction value of the encoding picture element based on values of the reference picture elements;

a first prediction error calculator (30) for calculating a difference between the value of the encoding picture element and the prediction value calculated by the first predictor (3) as a prediction error;

a determinator (4) for determining whether the prediction error calculated by the first prediction error calculator (30) indicates that the prediction is

correct or not, and for outputting the prediction result of the determination;
a first encoder (5) for receiving and encoding the prediction result of the determination output from the determinator (4), and for outputting the codeword representing the prediction result of the determinator (4); and
a second encoder (6) for encoding the prediction error calculated by the first prediction error calculator (30) into the codeword when the prediction is not correct, and for outputting the codeword representing the encoding picture element; and

wherein the second encoding section (102) comprises:
a second predictor (7) for calculating a prediction value of the encoding picture element based on values of the reference picture elements;
a second prediction error calculator (31) for calculating a difference between the value of the encoding picture element and the prediction value calculated by the second predictor (7) as a prediction error;
a third encoder (8) for encoding the prediction error calculated by the second prediction error calculator (31) into the codeword, and for outputting the codeword representing the encoding picture element; and

wherein the mode determinator (2) inputs the values of the reference picture elements and the prediction result of the determination output by the determinator (4) and selects an encoding mode between the specific encoding mode (Mode A) used by the first encoding section (101) and the encoding mode (Mode B) other than the specific encoding mode used by the second encoding

section (102) such that the specific encoding mode (Mode A) is kept when the determinator (4) determines that the prediction has proved to be correct, the specific encoding mode (Mode A) is released when the determinator (4) determines that the prediction has proved to be incorrect, an encoding mode between the specific encoding mode and the encoding mode other than the specific encoding modes is newly selected without keeping the specific encoding mode, the specific encoding mode (Mode A) is selected when the values of adjacent reference picture elements are the same and the encoding mode (Mode B) other than the specific encoding mode is selected when the values of the reference picture elements are not the same."

IX. The independent claims according to the first auxiliary request read as follows:

"1. An encoding apparatus (400), comprising:

a picture element memory (1) for receiving and storing a value of an encoding picture element to be encoded, and for outputting values of encoded picture elements adjacent to the encoding picture elements as values of reference picture elements;

a mode determinator (2) for determining one of a specific encoding mode and an encoding mode other than the specific encoding mode from a plurality of predefined encoding modes for the encoding picture element;

a first encoding section (101) for predicting the value of the encoding picture element, determining a

prediction result whether the prediction is correct or not, encoding the value of the encoding picture element based on the prediction result of the determination, and for outputting a codeword representing the encoding picture element under the determined specific encoding mode;

a second encoding section (102) for predicting the value of the encoding picture element, encoding the value of the encoding picture element, and for outputting a codeword representing the encoding picture element under the encoding mode other than the specific encoding mode;

an encoding controller (11) for selectively operating the first encoding section and the second encoding section based on a determined encoding mode of the mode determinator (2),

wherein the first encoding section (101) comprises:

a first predictor (3) for calculating a prediction value of the encoding picture element based on values of the reference picture elements;

a first prediction error calculator (30) for calculating a difference between the value of the encoding picture element and the prediction value calculated by the first predictor (3) as a prediction error;

a determinator (4) for determining whether the prediction error calculated by the first prediction error calculator (30) indicates that the prediction is correct or not, and for outputting the prediction result of the determination;

a first encoder (5) for receiving and encoding with a code order the prediction result of the determination output from the determinator (4), and for outputting a codeword representing the number of the prediction results indicating that the prediction is correct occurred before a prediction result, indicating that the prediction is not correct, or for outputting a codeword when said number becomes equal to the code order; and a second encoder (6) for encoding the prediction error calculated by the first prediction error calculator (30) into the codeword when the prediction is not correct, and for outputting the codeword representing the encoding picture element; and

wherein the second encoding section (102) comprises:

a second predictor (7) for calculating a prediction value of the encoding picture element based on values of the reference picture elements;

a second prediction error calculator (31) for calculating a difference between the value of the encoding picture element and the prediction value calculated by the second predictor (7) as a prediction error;

a third encoder (8) for encoding the prediction error calculated by the second prediction error calculator (31) into the codeword, and for outputting the codeword representing the encoding picture element; and

wherein the mode determinator (2) inputs the values of the reference picture elements and the prediction result of the determination output by the determinator (4) and selects an encoding mode between the specific encoding mode (Mode A) used by the first encoding section (101) and the encoding mode (Mode B) other than

the specific encoding mode used by the second encoding section (102) such that the specific encoding mode (Mode A) is continued when the determinator (4) determines that the prediction has proved to be correct, when the determinator (4) determines that the prediction has proved to be incorrect the encoding picture element is coded in the specific encoding mode (Mode A) and then the encoding mode (Mode B) other than the specific encoding mode is set, the specific encoding mode (Mode A) is selected when the values of adjacent reference picture elements are the same and the encoding mode (Mode B) other than the specific encoding mode is continued when the values of the reference picture elements are not the same."

"4. A decoding apparatus (500), comprising:

a picture element memory (41) for storing values of decoding picture elements to be decoded, and outputting values of the decoded picture elements adjacent to a decoding picture element as values of reference picture elements;

a mode determinator (42) for determining one of a specific decoding mode and a decoding mode other than the specific decoding mode from a plurality of predefined decoding modes for the decoding picture element;

a first decoding section (201) for receiving a codeword, predicting a value of the decoding picture element, determining a prediction result whether the prediction is correct or not, and for decoding the codeword into the value of the decoding picture element based on the

prediction result of the determination under the determined specific decoding mode;

a second decoding section (202) for receiving a codeword for the decoding picture element, predicting the value of the decoding picture element, decoding the codeword under the decoding mode other than the specific decoding mode; and

a decoding controller (43) for selectively operating the first decoding section and the second decoding section based on a determined decoding mode of the mode determinator (42), and

wherein the first decoding section (201) comprises:

a first predictor (3) for calculating a prediction value of the decoding picture element based on the values of the reference picture elements;

a first decoder (45) for decoding the codeword into a binary symbol sequence of prediction results of determination indicating whether the prediction is correct or not;

a second decoder (46) for decoding the codeword representing the decoding picture element into the prediction error when the prediction is not correct;

a first decoding picture element calculator (32) for calculating the value of the decoding picture element based on the prediction value of the decoding picture element calculated by the first predictor (3), and the prediction error obtained by the second decoder (46), and

wherein the second decoding section (202) comprises:
a second predictor (7) for calculating a prediction value of the decoding picture element based on the values of the reference picture elements;
a third decoder (48) for decoding the codeword representing the decoding picture element into the prediction error;
a second decoding picture element calculator (33) for calculating the value of the decoding picture element based on the prediction value of the decoding picture element calculated by the second predictor (7) and the prediction error obtained by the third decoder (48);
and

wherein the mode determinator (42) inputs the values of the reference picture elements and the prediction result of the determination decoded by the first decoder (45) and selects a decoding mode between the specific decoding mode used by the first decoding section (201) and the decoding mode other than the specific decoding mode used by the second decoding section (202), such that the specific decoding mode (Mode A) is continued when the prediction result of determination determines that the prediction has proved to be correct, when the prediction result determines that the prediction has proved to be incorrect the decoding picture element is decoded in the specific decoding mode (Mode A) and then the decoding mode (Mode B) other than the specific decoding mode is set, the specific decoding mode (Mode A) is selected when the values of adjacent reference picture elements are the same and the decoding mode (Mode B) other than the specific decoding mode is continued when the values of adjacent reference picture elements are not the same."

"7. An encoding method comprising:

an outputting step of receiving and storing a value of an encoding picture element and outputting values of encoded picture elements adjacent to the encoding picture element as values of reference picture elements;

a mode deciding step of determining one of a specific encoding mode and an encoding mode other than the specific encoding mode from a plurality of predefined encoding modes for the encoding picture element;

a first main encoding step of predicting the value of the encoding picture element, determining a prediction result whether the prediction is correct or not, encoding the value of the encoding picture element based on the prediction result of determination, and outputting a codeword representing the encoding picture element under the determined specific encoding mode;

a second main encoding step of predicting the value of the encoding picture element, encoding the value of the encoding picture element, and outputting a codeword representing the encoding picture element under the encoding mode other than the specific encoding mode;

an encoding controlling step of selectively operating the first main encoding step and the second main encoding step based on a determined encoding mode of the mode deciding step, and

wherein the first main encoding step comprises:

a first predicting step of calculating a prediction value of the encoding picture element based on the values of the reference picture elements;

a first prediction error calculating step of calculating a difference between the value of the encoding picture element and the prediction value calculated by the first predicting step as a prediction error;

a determination step of determining whether the prediction error calculated by the first prediction error calculating step indicates that the prediction is correct or not, and outputting the prediction result of the determination,

a first encoding step of receiving and encoding with a code order the prediction result of the determination output by the determination step and outputting a codeword representing the number of the prediction results indicating that the prediction is correct occurred before a prediction result, indicating that the prediction is not correct, or for outputting a codeword when said number becomes equal to the code order; and

a second encoding step of encoding the prediction error calculated by the first prediction error calculating step into the codeword when the prediction is not correct, and outputting the codeword for the encoding picture element, and

wherein the second main encoding step comprises: a second predicting step of calculating a prediction value of the encoding picture element based on the values of the reference picture elements;

a second prediction error calculating step of calculating a difference between the value of the encoding picture element and the prediction value calculated by the second predicting step as a prediction error;

a third encoding step of encoding the prediction error calculated by the second prediction error calculating step into the code word, and outputting the codeword representing the encoding picture element; and

wherein the mode deciding step selects an encoding mode between the specific encoding mode (Mode A) and the encoding mode (Mode B) other than the specific encoding mode based on the values of the reference picture elements and the prediction result of the determination step such that the specific encoding mode (Mode A) is continued when the determination step determines that the prediction has proved to be correct, when determination step determines that the prediction has proved to be incorrect the encoding picture element is coded in the specific encoding mode (Mode A) and then the encoding mode (Mode B) other than the specific encoding mode is set, the specific encoding mode (Mode A) is selected when the values of adjacent reference picture elements are the same and the encoding mode (Mode B) other than the specific encoding mode is continued when the values of adjacent picture elements are not the same."

"9. A decoding method, comprising:

an outputting step of storing values of decoding picture elements to be decoded, and outputting values

of the decoded picture elements adjacent to a decoding picture element as values of reference picture elements:

a mode deciding step of determining one of a specific decoding mode and a decoding mode other than the specific decoding mode from a plurality of predefined decoding modes for the decoding picture element;

a first main decoding step of receiving a codeword, predicting a value of the decoding picture element, determining a prediction result whether the prediction is correct or not, and decoding the codeword into the value of the decoding picture element based on the prediction result of the determination under the determined specific decoding mode;

a second main decoding step of receiving a codeword, predicting the value of the decoding picture element, and decoding the codeword under the decoding mode other than the specific decoding mode; and

a decoding controlling step of selectively operating the first main decoding step and the second main decoding step based on a determined decoding mode of the mode deciding step, and

wherein the first main decoding step comprises:

a first predicting step of calculating a prediction value of the decoding picture element based on the values of the reference picture elements;

a first decoding step of decoding the codeword into a binary symbol sequence of prediction results of determination indicating whether the prediction is correct or not;

a second decoding step of decoding the codeword representing the decoding picture element into the prediction error when the prediction is not correct; and
a first decoding picture element calculating step of calculating the value of the decoding picture element based on the prediction value for the decoding picture element calculated by the first predicting step, and the prediction error other than the predetermined value obtained by the second decoding step, and

wherein the second main decoding step comprises:
a second predicting step of calculating a prediction value of the decoding picture element based on the values of the reference picture elements;
a third decoding step of decoding the codeword representing the decoding picture element into a prediction error;
a second decoding picture element calculating step of calculating the value of the decoding picture element based on the prediction value calculated by the second predicting step and the prediction error calculated by the third decoding step; and

wherein the mode deciding step inputs the values of the reference picture elements and the prediction result of the determination output by the first decoding step and selects a decoding mode between the specific decoding mode used in the first main decoding step and the decoding mode other than the specific decoding mode used in the second main decoding step such that the specific decoding mode (Mode A) is continued when the prediction result of determination determines that the prediction has proved to be correct, when the

prediction result determines that the prediction has proved to be incorrect the decoding picture element is decoded in the specific decoding mode (Mode A) and then the decoding mode (Mode B) other than the specific decoding mode is set, the specific decoding mode (Mode A) is selected when the values of adjacent reference picture elements are the same and the decoding mode (Mode B) other than the specific decoding mode is continued when the values of adjacent reference picture elements are not the same."

X. The reasons in the decision under appeal, insofar as they are relevant for the present decision, may be summarised as follows.

(a) The problem to which the application is directed is to provide efficient encoding and decoding by switching between different types of encoding and decoding modes.

Claim 1 defines switching from Mode A to Mode B depending on whether the prediction is correct. According to the description, correctness may be asserted for instance for a prediction error having the value "0", "1" or "-3". Claim 1 thus allows embodiments which stay in Mode A for an arbitrarily chosen value of the prediction error, *i.e.* even when the predictions are grossly erroneous. Claim 1 thus allows modes which do not achieve the objective of the invention as disclosed (reason I.1).

Claim 1 defines a first and a second encoding section, each comprising an encoder for encoding

the prediction error. Claim 1 does not imply that the second encoder in the first encoding section and the third encoder in the second encoding section are different and output different code words. Switching between them thus solves no technical problem (reason I.2).

As a result, claim 1 allows embodiments not solving the technical problem and not making technical sense. It is therefore not supported by the description.

- (b) The expression "high matching probability" was neither present in the application as originally filed nor could it be derived therefrom and goes beyond a disclosure of a "prediction error of zero". It thus infringes Article 123(2) EPC (reason III.1).

XI. The appellant's argumentation, insofar as it is relevant for the present decision, may be summarised as follows.

An essential inventive feature of the encoding apparatus lies in the first encoder encoding the prediction result indicating whether the prediction is correct (for instance when the prediction error is zero), in contrast to the other encoders encoding the prediction error.

Claim 1 has to be considered as a whole, *i.e.* alleged unclear features may be rendered clear by other features of the claim. The first encoding section comprises a first encoder for outputting a codeword for

all the picture elements for which a correct value has been predicted, and a second encoder for encoding in a different way the prediction error when the prediction is not correct. The second encoding section encodes all prediction errors.

The operation of the mode determinator according to the last paragraph of claim 1 is based on the flow chart of figure 10. The skilled person gathers from claim 1 that the second and third encoders never operate simultaneously and that the determination of the encoding mode and/or encoder depends on the correctness of the prediction and on a condition for the reference picture elements.

Although the second and third encoders may be implemented with essentially the same configuration, the person skilled in the technical field of encoding deduces from the claim considered *in toto* that the first encoding section (with the second encoder) is used when a good predictability is given, for instance for monotonous graphics, whereas the second encoding section (with the third encoder) is used for pictures having a bad predictability, for instance colour photographs.

The application as a whole has to sufficiently disclose the invention for it to be carried out as required by Article 83 EPC, which is not at issue in the present case. In contrast, Article 84 EPC does not require that the claim define the details of the embodiments. The description teaches that in case of good predictability a very high efficiency can be achieved by the first encoder providing a codeword encoding a number of

prediction results before an incorrect prediction result is determined. The description also teaches that the second encoder generates shorter codewords than the third encoder because it is designed not to encode the zero prediction error. Setting out these details in claim 1 is however not necessary because claim 1 gives enough technical information for the skilled person to routinely implement the apparatus and solve the technical problem of enhancing coding efficiency.

The structure of the apparatus and the rules for choosing a mode and/or an encoder according to claim 1 provide sufficient flexibility for the skilled person to design an implementation having an enhanced compression efficiency, and to routinely discard disadvantageous or technically senseless implementations, even if those are in principle allowed by the claim.

As a result, claim 1 and the further corresponding independent claims are supported by the description.

Reasons for the Decision

1. The appeal is admissible.
2. *The problems presented in the application*
 - 2.1 For convenience, references to the description below will be made by reference to identical passages of the description and the figures as published under EP 0 827 342 A1, the amendments made by deletion of subject-matter and renumbering of the figures with

letter dated 17 July 2001 having no influence on the present decision.

The description refers to a "related art 2" for counting and encoding a number of consecutive more probable symbols (MPS) into a codeword using a plurality of codeword tables. The codeword tables must allot an (at least one-bit long) code for each picture element regardless of whether or not the prediction has proved to be correct (see column 2, lines 23 to 33; column 6, lines 27 to 49 and figures 67 and 68). The description also refers to a "related art 3" switching between a mode A and a mode B for encoding/decoding depending on a condition for the value(s) of reference picture element(s) (see column 4, lines 34 to 57 and figure 69). According to a further "related art 4", an apparatus switches between an encoding section comprising a lossy picture compression circuit and an encoding section comprising a lossless picture compression circuit according to the condition (see column 6, line 50, to column 7, line 3 and figure 70).

2.2 The most general object of the present invention is presented as efficiently implementing encoding and decoding of picture information, in particular by switching between different types of encoding and decoding systems (see column 7, lines 25 to 34).

3. *Main request*

3.1 As is apparent from the description, in view of this background encoding efficiency is considerably enhanced in the first place by the first encoder outputting a codeword for a series of more probable symbols (MPS),

essentially by forming a codeword reflecting the count of consecutive MPS (see column 32, line 52, to column 33, line 30, and column 37, lines 38 to 47). The first encoder encodes into a single codeword a series of consecutive MPS as prediction results indicating a correct prediction (*i.e.* Boolean-type match/mismatch binary information), for instance a series of zeroes (see figure 67). Encoding the count of correct prediction results instead of each (low or zero) prediction error (for each of which at least a one-bit code is required) can greatly reduce the number of encoding bits for images with good predictability. The first encoder operates under these favourable conditions only if the rules for switching the encoding mode under which the first encoder operates are chosen such that the first encoder predominantly receives series of MPS.

Therefore the features are presented as essential which make the first encoder suitable for predominantly processing series of picture elements yielding prediction results consecutively indicating a correct prediction by switching the encoding mode according to judicious rules, and for efficiently encoding such series of prediction results representing the encoding picture elements.

The disclosure in the description having regard to the technical problems and the advantageous effects of the invention supports a claim where these features constitute the improvement over the known pieces of "related art" referred to in the description. The board can see no support in the description for a generalised teaching that a combination of switching between

encoding modes and, in one of the encoding modes, switching between two encoders would provide an enhanced coding efficiency. It follows that the requirement of support by the description according to Article 84 EPC 1973 is fulfilled only if the claimed encoding apparatus reflects these essential features.

3.2 The last paragraph of claim 1 sets out rules for setting (and releasing) an encoding mode relying on the correctness of the prediction and on whether the values of adjacent reference picture elements are the same or not. The former rule expresses the difference between the encoding picture element (the actual value of the pixel to be encoded) and the prediction value calculated by the predictor. If the difference is zero (or close to zero) the prediction is considered as correct. The latter rule provides an indication about the predictability of a picture element, *i.e.* about the likelihood that the prediction result for the encoding picture element will be correct (see figure 69 and the condition boxes S15 and S16 in the flow chart of figure 10). The specific encoding mode (under which the first and second encoders operate) is thus predominantly determined for predictable picture elements.

3.3 However the first encoder according to claim 1 is merely defined as "for receiving and encoding the prediction result of the determination output from the determinator (4), and for outputting the codeword representing the prediction result of the determinator (4)". It may output a codeword for each prediction result and may, for instance, also be used together with the second encoder to output a codeword for a

given picture element (see "outputting a codeword representing the encoding picture element" in the feature specifying the first encoding section). Claim 1 is thus not explicitly limited to the first encoder receiving and encoding a prediction result indicating a correct prediction into a codeword, let alone encoding a series or a sequence thereof into the codeword. The board also does not see a limitation on the first encoder that would implicitly result from the determination of the encoding mode (see the foregoing section) and from the definition of the second encoder.

As a result, claim 1 does not define all the features of the first encoder identified in section 3.1 above as necessary to achieve enhanced coding efficiency.

3.4 The board accepts that the first encoder encoding prediction results (*i.e.* binary results), rather than prediction errors (*i.e.* values in the range [-255, +255] in the examples of figures 8 and 9), is a crucial feature of the invention. It is however *per se* not sufficient to bring about the enhanced coding efficiency, if claim 1 does not specify the essential features to ensure that the first encoder predominantly receives and encodes sequences of more probable binary symbols representing such prediction results as a codeword.

3.5 The appellant argues that an apparatus with two sections and three encoders is more flexible and therefore may be better optimised than the prior art systems. However this does not take into account that encoding apparatuses with several encoders are acknowledged in the description as being state of the

art, in particular according to the "related art 3" or the "related art 4" disclosing the switching between two encoding modes or sections (see point 2.2 above). The present invention proposes to improve such prior art (see column 5, lines 26 to 37, and column 6, line 50, to column 7, line 29). The board agrees with the appellant that three encoders allow in principle more flexibility than one or two and that they may be implemented so as to bring about the sought-after advantage. This structure alone is however not sufficient in the board's view to bring about the enhanced coding efficiency of the present invention.

3.6 The appellant argues that the skilled person would discard embodiments of the invention not regarded as advantageous, *i.e.* embodiments not achieving an enhanced efficiency. However in accordance with Article 84 EPC 1973 the claims shall define the matter for which protection is sought. To this effect they have to explicitly specify all of the essential features needed to define the invention as it can be understood from the description.

3.7 In conclusion, claim 1 is not supported by the description and therefore infringes Article 84 EPC 1973.

3.8 As a result, the main request is not allowable.

4. *First auxiliary request*

4.1 Claim 1 sets out features of the first encoder (for outputting a codeword when the number of prediction results indicating a correct prediction is equal to the code order; see the first line of the codeword

allotment table of figure 67) or representing their number before a prediction result indicating an incorrect prediction (see the following lines of the table of figure 67). The last paragraph of claim 1 sets out the mode determinator switching between the two encoding modes (Mode A, Mode B) essentially according to the rules for mode setting as in the flow chart of figure 10.

Claim 1 thus defines both the first encoder coding a sequence, or a number, of binary symbols into a codeword and the rules ensuring that the first encoder predominantly receives and encodes more probable binary symbols (see sections 3.1 and 3.2 above).

- 4.2 As a result, claim 1 defines the essential technical features ensuring that enhanced coding efficiency may be achieved and is supported by the description in the meaning of Article 84 EPC 1973.
- 4.3 The examining division objected that claim 1 was not so worded as to imply that the second and third encoders would be different and output different codewords. The board is of the opinion that the (amended) definition of the conditions essentially according to the flow chart of figure 10 for switching between the two encoding modes, *i.e.* between the first and second encoding sections respectively comprising the second and third encoders, ensures that the first encoding section (comprising the second encoder) and thus a specific encoding mode is selected when identical values of the reference picture elements hint at good predictability. The second encoding section (comprising the third encoder) and thus the encoding mode other

than the specific encoding mode is only selected when the values of the reference picture elements hint at bad predictability. Switching between them thus makes technical sense under these conditions because both the second and third encoders can be adapted to their different tasks, the second encoder only encoding the prediction error before the mode is changed and the third encoder encoding prediction errors in case of bad predictability, regardless of whether the prediction is correct.

- 4.4 Corresponding definitions are included in the other independent claims relating to the corresponding decoding apparatus (claim 4), encoding method (claim 7) and decoding method (claim 9). These claims are therefore also supported by the description in the meaning of Article 84 EPC 1973.

5. In view of the amendments made, none of the grounds for refusing the present application applies any more to the first auxiliary request, and the decision under appeal must be set aside for the following reasons.
 - 5.1 A first reason (I.1) for the refusal for lack of support by the description relies on the alleged broad meaning of a "correct" prediction. A correct prediction in the context of the present application may correspond to an exact prediction, *i.e.* a zero prediction error (see, for instance, column 31, lines 55 to 58). It also covers a non-zero predetermined error value, for instance +1 or -3 (see column 28, line 44, to column 29, line 3).

The board is of the opinion that the illustrative examples (+1, -3) mentioned in the description are sufficiently close to the zero value with respect to the full range [-255, +255] for the prediction error (see figure 8) so as to establish a distinction between a correct and an incorrect prediction, whilst expressing that a correct prediction is not necessarily an exact prediction. The board cannot therefore follow the examining division's argument that Mode A may be determined even when "the predictions are grossly erroneous". The determination of a "correct" prediction is therefore sufficiently clear and supported by the description.

5.2 A second reason (I.2) for the refusal for lack of support by the description essentially relies on the lacking distinction in operation between the second and third encoders. For the reasons given in point 4.3 above, the board does not share this view as far as the present claims are concerned because these encoders now clearly have different tasks and a person skilled in the art would choose suitable coding techniques (for instance different codeword tables; see figures 8 and 9) to minimize the number of encoding bits for accomplishing the different tasks. Optimizing encoders in this way would be daily routine for a person skilled in this technical field.

5.3 Furthermore the reference to a "high matching probability", found to infringe Article 123(2) EPC in the decision under appeal (see reason III.1 thereof), is no longer present in the claims according to the first auxiliary request. As a result, the ground for

refusing the present application under Article 123(2) EPC no longer applies.

5.4 In conclusion, the grounds for refusing the present application do not apply any more to the claims according to the first auxiliary request.

6. *Remittal to the first instance*

The examining division has dealt essentially with the issue of support by the description in the examination proceedings. A full examination as to whether the application complies with the other requirements of the EPC is still outstanding. In view of this situation the board exercises its discretion in accordance with Article 111(1) EPC 1973 and decides to remit the case to the first instance for further prosecution on the basis of the first auxiliary request. The board has noted that the set of claims still shows several linguistic and typographical errors which are reproduced in the set of claims above as they were filed.

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.

The Registrar

The Chairman

L. Fernández Gómez

F. Edlinger