Datasheet for the decision
of 27 September 2017

Case Number: T 1263/12 - 3.5.04
Application Number: 02772969.8
Publication Number: 1401214
IPC: H04N7/32
Language of the proceedings: EN

Title of invention:
MOVING PICTURE ENCODING METHOD AND MOVING PICTURE DECODING METHOD

Applicant:
Panasonic Intellectual Property Corporation of America

Headword:

Relevant legal provisions:
EPC Art. 123(2)
EPC 1973 Art. 56, 111(1)

Keyword:
Amendments - main-request - allowable (no)
Inventive step - auxiliary request A (no)
Remittal to the department of first instance
Decisions cited:

Catchword:
Case Number: T 1263/12 - 3.5.04

DECISION
of Technical Board of Appeal 3.5.04
of 27 September 2017

Appellant: Panasonic Intellectual Property Corporation of America
(Applicant)
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Decision under appeal: Decision of the Examining Division of the European Patent Office posted on 18 November 2011 refusing European patent application No. 02772969.8 pursuant to Article 97(2) EPC.

Composition of the Board:
Chairman C. Kunzelmann
Members: B. Willems
B. Müller
Summary of Facts and Submissions

I. The appeal is against the decision of the examining division dated 18 November 2011 refusing European patent application No. 02 772 969.8 published as EP 1 401 214 A1.

II. In the decision under appeal the following documents were cited:


III. The application was refused on the grounds that the subject-matter of claim 1 according to the main request was not new (Article 54 EPC 1973) over document D3.
which made reference to and incorporated features disclosed in document D4, and the subject-matter of claim 1 of the auxiliary request extended beyond the content of the application as filed (Article 123(2) EPC). In an "obiter dictum", the examining division gave reasons as to why the subject-matter of claim 1 of the auxiliary request lacked inventive step over the combination of the disclosures of documents D3 and D4 and the common general knowledge of the person skilled in the art as exemplified by document D1 (Article 56 EPC 1973).

IV. In the statement of grounds of appeal, the appellant requested that the impugned decision be set aside and that a patent be granted on the basis of the claims according to the main request underlying the decision under appeal. The appellant provided arguments as to why it considered the subject-matter of independent claim 1 to be new and to involve an inventive step. It also filed an auxiliary request that the case be remitted to the examining division for further substantive examination.

V. In a communication under Article 15(1) RPBA (Rules of Procedure of the Boards of Appeal, OJ EPO 2007, 536), annexed to the summons to oral proceedings, the board gave its provisional opinion that:

(a) the subject-matter of claim 1 of the main request extended beyond the content of the application as filed (Article 123(2) EPC);

(b) claim 1 did not meet the requirements of Article 84 EPC 1973;
(c) the subject-matter of claim 1 was novel over the disclosures of documents D3 and D4 (Article 54 EPC 1973);

(d) the subject-matter of claim 1 lacked inventive step over the combination of the disclosures of documents D4 and D1 and the common general knowledge of the person skilled in the art (Article 56 EPC 1973).

The board further indicated that, as the claims then on file corresponded to the claims which had formed the basis for the impugned decision, it did not intend to remit the case under Article 111(1) EPC 1973.

VI. With a letter of reply dated 25 August 2017, the appellant filed amended claims 1 to 3 according to a main request and an auxiliary request I, and amended claims 1 to 4 according to auxiliary requests II and III, all requests replacing all the previous requests on file. The appellant provided arguments as to why it considered the amended claims according to the new main and auxiliary requests to meet the requirements of Article 123(2) EPC, Article 84 EPC 1973 and Article 56 EPC 1973.

VII. The board held oral proceedings on 26 and 27 September 2017. The appellant was represented. During the oral proceedings, the appellant filed claims 1 and 2 according to further auxiliary requests A and B, and further modified the claims according to auxiliary requests A and B.

The appellant requested that the decision under appeal be set aside and that a European patent be granted on the basis of the claims of the main request filed with
the letter dated 25 August 2017, or on the basis of the claims of auxiliary request A in modified form filed during the oral proceedings of 26 September 2017, or that the case be remitted to the department of first instance for further prosecution.

At the end of the oral proceedings, the chairman announced the board's decision.

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

"A moving picture coding method for coding a moving picture,

wherein in said moving picture coding method, a picture is coded by one of an intra picture coding method and an inter picture coding method,

an intra coded picture coded by the intra picture coding method is decoded by decoding only a coded picture signal of the intra coded picture,

when a picture \((P4)\) is coded by the inter picture coding method, at least one of the following pictures is selected as a reference picture: an intra coded picture \((P2)\) which is coded by the intra picture coding method; a coded picture \((P1)\) located before the intra coded picture \((P2)\) in coding order; and a coded picture \((P3)\) located after the intra coded picture \((P2)\) in coding order, and

said moving picture coding method comprises:

a storing a coded picture as a reference picture in a memory \((408, 409, 410)\),
a specifying, from among reference pictures stored in the memory (408, 409, 410), the intra coded picture (P2) as a specified picture which is used for restricting selection of the reference picture; and

in case where the intra coded picture (P2) is specified as the specified picture in said specifying, coding information which indicates that the intra coded picture (P2) is specified as the specified picture which is used for restricting selection of the reference picture, characterized in that

for a picture (P4) to be coded by the inter picture coding method located after the specified picture in coding order, selecting, as the reference picture, at least one of the following pictures: the specified picture (P2) and a coded picture (P3) which is located after the specified picture (P2) in coding order, while a coded picture (P1) which is located before the specified picture (P2) in coding order is prohibited from being selected as the reference picture; and

in case where the intra coded picture (P2) is not specified as the specified picture in said specifying, coding information which indicates that the intra coded picture (P2) is not specified as the specified picture, for a picture (P4) to be coded by the inter picture coding method located after the intra coded picture (P2) which is not specified as the specified picture in coding order, selecting, as the reference picture, at least one of the following pictures: the intra coded picture (P2) which is not specified as the specified picture, a coded picture (P1) located before the intra coded picture (P2) which is not specified as the specified picture in coding order, and a coded picture (P3) located after the intra coded picture (P2) which
is not specified as the specified picture in coding order."

IX. Claim 1 of auxiliary request A reads as follows:

"A moving picture coding method for coding a moving picture,

wherein in said moving picture coding method, a picture is coded by one of an intra picture coding method and an inter picture coding method,

an intra coded picture coded by the intra picture coding method is decoded by decoding only a coded picture signal of the intra coded picture,

when a picture (J4) is coded by the inter picture coding method, one of the following pictures is selected as a reference picture: an intra coded picture (J2) which is coded by the intra picture coding method; a coded picture (J1) located before the intra coded picture (J2) in coding order; and a coded picture (J3) located after the intra coded picture (J2) in coding order, and characterized in that

the intra coded picture (J2) is used as of a first type or a second type,

wherein the intra coded picture (J2) of the first type is used for restricting selection of the reference picture and the intra coded picture (J2) of the second type is used for not restricting selection of the reference picture; and
wherein the moving picture coding method comprises

coding information for distinguishing the two types of
the intra coded picture (J2),

wherein

for a picture (J4) to be coded by the inter picture
coding method located after the intra coded picture
(J2) of the first type in coding order, selecting, as
the reference picture, one of the following pictures:
the intra coded picture (J2) of the first type and a
coded picture (J3) which is located after the intra
coded picture (J2) of the first type in coding order,
while a coded picture (J1) which is located before the
intra coded picture (J2) of the first type in coding
order is prohibited from being selected as the
reference picture; and

for a picture (J4) to be coded by the inter picture
coding method located after the intra coded picture
(J2) of the second type in coding order, selecting, as
the reference picture, one of the following pictures:
the intra coded picture (J2) of the second type, a
coded picture (J1) located before the intra coded
picture (J2) of the second type in coding order, and a
coded picture (J3) located after the intra coded
picture (J2) of the second type in coding order."

X. Claim 1 of auxiliary request B reads as follows:

"A moving picture coding method for coding a moving
picture and for recording the coded moving picture on a
recording medium for later reproduction,

wherein in said moving picture coding method, a picture
is coded by one of an intra picture coding method and
an inter picture coding method,"
an intra coded picture coded by the intra picture coding method is decoded by decoding only a coded picture signal of the intra coded picture, when a picture \((J4)\) is coded by the inter picture coding method, one of the following pictures is selected as a reference picture: an intra coded picture \((J2)\) which is coded by the intra picture coding method; a coded picture \((J1)\) located before the intra coded picture \((J2)\) in coding order; and a coded picture \((J3)\) located after the intra coded picture \((J2)\) in coding order, and characterized in that

the intra coded picture \((J2)\) is used as of a first type or a second type,

wherein the intra coded picture \((J2)\) of the first type is used for restricting selection of the reference picture and the intra coded picture \((J2)\) of the second type is used for not restricting selection of the reference picture; and

wherein the moving picture coding method comprises coding information for distinguishing the two types of the intra coded picture \((J2)\),

wherein

for a picture \((J4)\) to be coded by the inter picture coding method located after the intra coded picture \((J2)\) of the first type in coding order, selecting, as the reference picture, one of the following pictures: the intra coded picture \((J2)\) of the first type and a coded picture \((J3)\) which is located after the intra coded picture \((J2)\) of the first type in coding order, while a coded picture \((J1)\) which is located before the intra coded picture \((J2)\) of the first type in coding
order is prohibited from being selected as the reference picture; and
for a picture (J4) to be coded by the inter picture coding method located after the intra coded picture
(J2) of the second type in coding order, selecting, as the reference picture, one of the following pictures:
the intra coded picture (J2) of the second type, a coded picture (J1) located before the intra coded
picture (J2) of the second type in coding order, and a coded picture (J3) located after the intra coded
picture (J2) of the second type in coding order."

XI. The examining division's reasons for the decision under appeal, and the arguments set out in its "obiter
dictum", which are relevant to the present decision may be summarised as follows:

(a) Document D3 explicitly referred to the draft
standard H.26L version TML6 disclosed in D4. Thus
the disclosures of D3 and D4 could be combined to
raise a novelty objection. In combination, the two
documents disclosed all the features of claim 1 of
the main request (see section 13 of the decision under appeal).

(b) According to claim 1 of the auxiliary request, the
reference picture was selected based on the
calculated number of reference pictures, which were
stored pictures, whereas according to the
application as filed the number of potential reference pictures "is set to the counted number of all pictures after a specified intra picture
[... i.e.] all coded pictures are counted, which
includes stored (I and P-frames) and non-stored
(B-frames) pictures" (see point 14.1 of the
decision under appeal). Further, the application as
filed did not directly and unambiguously disclose that "reference picture selection after a non specified Intra picture is based on the calculated number of reference pictures coded after the intra coded picture which is not specified" (see point 14.2 of the decision under appeal).

(c) D4 stated that a generalised H.263 Annex U functionality had been adopted for inclusion in TML-5. D1 disclosed details of multiple reference frame prediction in the H.263 Annex U mode. The skilled person would have used these details to implement the prediction scheme of D3 and D4.

XII. The appellant's arguments which are relevant to the present decision may be summarised as follows:

(a) Article 123(2) EPC

   (i) According to the embodiment described with respect to Figure 6, a picture preceding a specified intra coded picture could not be selected as a reference picture. However, the passage on page 29, line 23 to page 30, line 7 of the application as filed made it clear that while in the embodiment the selection of reference pictures was limited, it was also possible not to limit the selection of reference pictures, i.e. it was possible to provide another type of intra coded picture so that pictures coded prior to such intra coded picture could be referred to. Hence, the cited passage suggested providing either a first type or a second type of intra coded picture according to need.
(ii) It was apparent from a comparison between the description of the Reset signal on page 20, lines 8 to 18 and the prior-art Reset signal described with respect to Figures 1 and 2 that the Reset described on page 20 triggered the generation of an intra coded picture and restricted access to reference pictures coded before the intra coded picture, whereas the prior-art Reset signal merely triggered the generation of an intra coded picture without any bearing on buffer management.

(iii) The person skilled in the art would have readily understood that when modifying the picture coding illustrated by Figure 6 as suggested on pages 29 and 30, the Reset signal input to the coder would have had to be the prior-art Reset signal. Thus, the Reset signal would have triggered the generation of an I picture which would have been stored and specified in the memory as restricting access to reference pictures.

(iv) The interpretation set out in point (iii) above was further supported by the wording of original claim 2: "a specifying step for specifying an intra coded picture of a plurality of pictures stored in a memory as a picture which is an anchor for restricting a candidate for a reference picture". Specifying an intra coded picture as an anchor and coding the Reset signal as shown in Figure 7 (see letter dated 25 August 2017, paragraph bridging pages 4 and 5) would only have made sense if it
were also possible not to specify the intra coded picture as an anchor. Specifying always implied the option of not specifying the picture.

(b) Inventive step (Article 56 EPC 1973)

(i) Document D4 disclosed intra coded pictures not limiting access to earlier coded reference pictures. The objective technical problem in view of the disclosure of D4 was to provide higher error robustness while maintaining high coding efficiency and allowing random access. D1 merely addressed the issue of error propagation, not the issue of random access.

(ii) The person skilled in the art would not have combined the disclosures of documents D4 and D1. D4 referred to a different document disclosing the H.263 Annex U functionality.

(iii) In the method known from document D1, the signal triggering the coding of an intra coded frame and restricting access to preceding frames was generated by the decoder to handle transmission errors. This decision had to be communicated to the coder via a back channel. In contrast, according to claim 1, the signal triggering the coding of an intra coded picture was input to the encoder. Moreover, it was implicit from the reference to "coding a moving picture" that the coding was
performed without any feedback from the decoder.

(iv) According to document D1, the transmission of the RESET signal was linked to the transmission of SPWI, SPHI and SPTN code words.

(v) According to document D1, when the buffer was reset, all pictures in the buffer became unusable as a reference. In contrast, in the method of claim 1 at least the intra coded picture of the first type, or a coded picture located after said picture, could be selected as a reference picture.
Reasons for the Decision

1. The appeal is admissible.

2. Main request - added subject-matter (Article 123(2) EPC)

2.1 Claim 1 of the main request comprises the feature of

"specifying, from among reference pictures stored in the memory (408, 409, 410), the intra coded picture (P2) as a specified picture which is used for restricting selection of the reference picture".

2.2 Thus, in the terminology of the description, for the intra coded picture stored in the memory a flag is set to indicate whether or not this picture will be used as an "anchor".

2.3 The board is not convinced by the appellant's arguments that the feature identified in point 2.1 above is directly and unambiguously derivable from the application as filed.

It is undisputed that the passage from page 29, line 23 to page 30, line 7 of the application as filed suggests providing a first type of intra coded picture which allows the selection of a reference picture located before the intra coded picture, and a second type of intra coded picture which does not. Either the first type or the second type of intra coded picture is provided upon need, i.e. the type of intra coded picture is specified upon coding, not after frames have been stored in memory.
Even if the appellant's argument in points XII (a)(ii) and (iii) above were correct, and therefore the selection between two types of intra coded pictures implied that the generation of an intra coded picture could only be triggered by a Reset signal not deleting stored reference pictures, such generation would result in generating an intra coded picture upon receiving a Reset signal and storing in the memory the intra coded picture together with a flag indicating whether or not the picture had been specified. The kind of Reset signal input to the coder, with or without buffer management, does not affect whether the intra coded picture is specified upon coding or later, by accessing the memory and specifying the picture already stored.

The board has not been persuaded by the appellant's argument (see point XII(a)(iv) above) that in original claim 2 the word "specifying" implies that the intra coded picture could both be specified and not specified as an anchor. The word "specifying" merely means that a characteristic of the intra coded picture (as an anchor) is explicitly stated; it does not suggest a choice as to whether or not to attribute this characteristic. Thus, according to original claim 2, intra coded pictures stored in the memory are always used as an anchor. This corresponds to the disclosure of the embodiment described with respect to Figure 6. Therefore, original claim 2 does not provide a clear and unambiguous basis for setting, for a stored intra coded picture, a flag indicating whether or not this picture is to be used as an anchor.

2.4 It follows from the above that the subject-matter of claim 1 of the main request extends beyond the disclosure of the application as filed (Article 123 EPC).
3. **Auxiliary request A - inventive step (Article 56 EPC 1973)**

3.1 It is unchallenged that document D4 is the closest prior art for the assessment of inventive step.

D4 discloses a coding method providing intra (I), inter (P) and B predicted pictures (see 3.2 Picture type), wherein pictures can be predicted from more than one previous decoded picture (3.2 "Code_number = 1: Inter picture with possibility of prediction from more than one previous decoded picture. For this mode information reference picture for prediction must be signalled for each macroblock" and 3.5 Reference frame). Thus D4, 3.2 and 3.5 disclose that P pictures can be predicted from a reference frame at least three frames back. D4, 5.2.3 discloses that "A search is made ... from the 5 past decoded pictures". Prediction from multiple previous decoded pictures implies that these pictures are stored in a reference picture buffer.

The appellant confirmed that the method known from D4 corresponds to the prior art method acknowledged on page 3 of the present application ("As of September, 2001, the proposed H.26L standard allows ... also reference to an arbitrary picture selected, as a reference picture, from a plurality of pictures which have been coded or decoded prior to the current picture").

3.2 Further, it is undisputed that the subject-matter of claim 1 of auxiliary request A differs from the disclosure of document D4 by the use of two types of intra coded pictures either restricting the selection of reference pictures or not.
3.3 The board can only partly agree with the appellant's definition of the objective technical problem (see point XII (b)(i)). The claimed coding of intra coded pictures and buffer management simultaneously both reduces error propagation and facilitates random access. These technical effects relate to alternative problems to be solved: increasing error robustness and allowing random access. The technical effects do not relate to problems to be solved at the same time. Thus, the objective technical problem to be solved can be defined as one of the problems identified above, i.e. providing higher error robustness while maintaining high coding efficiency.

3.4 Unlike the appellant, the board is of the opinion that the reference to the H.263 Annex U functionality would prompt the person skilled in the art to combine the teachings of documents D4 and D1, even though document D4 does not refer to document D1 as such.

3.5 Document D1, page 13 defines a stored picture as a non-B picture which does not contain an MMCO command in its ERPS layer which marks that picture as "unused". A picture can be stored with an MMCO command in its ERPS layer specifying a RESET equal to "1". RESET is a single-bit fixed-length code word and, if its value is set to "1", all pictures in the multi-picture buffer, but not the current picture, will be marked "unused" (see page 15, U.3.1.5.16 Buffer Reset Indicator). The RESET MMCO command is first processed, and then the current picture is added to the buffer (page 22, first paragraph). If the back channel message is a NACK indicating the loss or erroneous decoding of data (page 24, U.5.2.1), and RPNT indicates that no valid picture is in the buffer, the buffer is reset by
an I picture with RESET equal to "1" (see page 25, U.5.2.7).

Summarising, D1 discloses storing I (intra coded) and P pictures in a reference picture buffer. If no valid pictures are available at the decoder, a signal is sent to the encoder to reset the buffer with an I picture stored together with a RESET "1" in its ERPS layer marking all pictures in the buffer but not the current picture as unused. Thus, contrary to the appellant's statement (see point XII (b)(v)), after an I picture with RESET "1", the I picture and the pictures stored after it can be used as reference pictures, only those stored before the I picture cannot be thus used. I pictures not stored with RESET "1" do not prohibit access to reference pictures stored before the I picture.

3.6 It is common ground that according to claim 1 the picture type is not necessarily an "intrinsic feature" of an intra coded picture, but any intra coded picture can be signalled by a separate flag as being of a first type or a second type. The board is however not convinced by the appellant's argument that the RESET signal known from document D1 is not suitable for signalling the type, because RESET can only be signalled together with SPWI, SPHI and SPTN code words. Document D1, section U.3.1.5.15 discloses the option of removing whole pictures, i.e. "SPWI and SPHI have whole-picture dimensions". It is immediately apparent that when the buffer is to be reset by an I picture with RESET equal to "1", RESET is signalled together with SPWI and SPHI, indicating that whole pictures are to be removed. Therefore, despite the necessity to signal RESET "1" together with SPWI and SPHI, RESET is
not only suitable for signalling but actually signals the picture type of the intra coded picture.

3.7 Claim 1 of auxiliary request A specifies coding information for distinguishing between a first type of intra coded picture used for restricting selection of a reference picture and a second type of intra coded picture used for not restricting this selection. Assuming the appellant is correct in stating that the intra coded picture and the picture type are coded when a trigger signal is input (see point XII(b)(iii) above), the board notes that claim 1 does not specify a trigger signal. Instead the description has to be consulted to determine a causal relationship between the input of a signal and the coding of an intra coded picture signal. Both in the prior-art apparatus shown in Figure 2 and the embodiment shown in Figure 4, an intra picture coding instruction signal (Reset) is input "from outside" (see also page 6, lines 19 to 25: "the motion estimation unit 401 can switch into the intra picture coding forcibly according to the instruction of an intra picture coding instruction signal Reset given from outside"). The board therefore concludes that both in the prior art and the present application, in order to prevent error propagation, a signal is sent to the coder to forcibly code an intra coded picture and to generate a signal prohibiting access to previously stored pictures. The prior art uses the term RESET for the signal generated by the coder in response to receiving an RPNT indicating there is no valid picture in the decoder buffer, whereas the present application uses the term RESET for the signal received by the coder. This different use of the term "RESET" does not mean that the respective coders function in a different manner.
3.8 It follows from the above that the subject-matter of claim 1 of auxiliary request A lacks inventive step over the combined disclosures of D4 and D1 and the common general knowledge of the person skilled in the art (Article 56 EPC 1973).

4. Remittal (Article 111(1) EPC 1973)

4.1 Claim 1 of auxiliary request B specifies "A moving picture coding method for coding a moving picture and for recording the coded moving picture on a recording medium for later reproduction".

4.2 The application as filed, page 19, lines 24 to 30 discloses that "to start reproduction at some midpoint of a picture signal recorded on a DVD or a hard disk, a mechanism for the midpoint reproduction is required, so Reset is instructed at the picture from which reproduction is to be started. This Reset instruction may be determined and made by an operator when coding pictures, or at every predetermined picture cycle or time lapse."

4.3 The appellant submitted that since any picture following an intra coded picture of the first type can be reproduced without referring to a picture preceding that intra coded picture, coding the type of picture allows the decoder to jump forwards or backwards to a picture of the first type and to start reproduction from said intra coded picture. The documents cited in the decision under appeal do not address such midpoint reproduction of recorded pictures.

In particular, according to the appellant, the wording of the claim excludes the presence of a back channel for transmitting a message when no valid reference
picture is present in the buffer at the decoder side, as taught by document D1. Therefore, the person skilled in the art would not consider the disclosure of document D1 when addressing the problem of providing midpoint reproduction of a recorded moving picture.

4.4 For the reasons given above, the board judges that in view of the facts and evidence adduced by the examining division, the decision under appeal has to be set aside on the basis of auxiliary request B. Considering that the reference to recording emphasises a different problem to be solved, it is clear that the issue of inventive step of the subject-matter of claim 1 of auxiliary request B could not have been dealt with in the decision under appeal. Moreover, the international search report and the supplementary European search report comprise further documents which the board has not considered in the appeal proceedings as they were not discussed in the decision under appeal or in the appellant's submissions. Therefore, the board finds it appropriate to allow the appellant's auxiliary request that the case be remitted to the examining division for further prosecution.

4.5 In view of the above, the board decided to exercise its discretion to remit the case to the department of first instance for further prosecution.
Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution.

The Registrar: The Chairman:

K. Boelicke C. Kunzelmann

Decision electronically authenticated