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**Datasheet for the decision
of 22 January 2024**

Case Number: T 1630/20 - 3.5.04

Application Number: 15716231.4

Publication Number: 3120555

IPC: H04N19/503

Language of the proceedings: EN

Title of invention:

USING A CURRENT PICTURE AS A REFERENCE FOR VIDEO CODING

Applicant:

Qualcomm Incorporated

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (yes)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 1630/20 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 22 January 2024

Appellant:
(Applicant)

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Representative:

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Decision under appeal:

**Decision of the Examining Division of the
European Patent Office posted on 13 November
2019 refusing European patent application
No. 15716231.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair B. Willems
Members: M. Paci
G. Decker

Summary of Facts and Submissions

- I. The appeal is against the examining division's decision refusing European patent application No. 15 716 231.4, published as international patent application WO 2015/143395 A1.
- II. In the decision under appeal, the examining division cited the following documents:
- D1: S.-L. Yu and C. Chrysafis: "New Intra Prediction using Intra-Macroblock Motion Compensation", JVT-C151, Joint Video Team (JVT) of ISO/IEC MPEG and ITU-T VCEG (ISO/IEC JTC1/SC29/WG11 AND ITU-T SG16 Q.6), 3rd meeting: Fairfax, Virginia, USA, 6 May 2002, pages 1-3, XP008158737
- D2: G. Sullivan et al.: "Meeting Report of the 15th meeting of the Joint Collaborative Team on Video Coding (JCT-VC)", Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 15th meeting: Geneva, Switzerland, 23 October 2013 to 1 November 2013, URL: [HTTP://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/](http://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/), no. JCTVC-O1000, 9 January 2014, XP030115455
- D3: D. Flynn et al.: "High Efficiency Video Coding (HEVC) Range Extensions text specification: Draft 4", Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 13th meeting: Vienna, Austria, 25 July 2013 to 2 August 2013, URL: [HTTP://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/](http://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/), no. JCTVC-N1005-v3, 8 August 2013, XP030114950
- III. The decision under appeal was based on the grounds that the subject-matter of claim 1 of the main request, the

first auxiliary request and the second auxiliary request then on file did not involve an inventive step in view of document D1 (Articles 52(1) and 56 EPC).

IV. The applicant (appellant) filed notice of appeal. With its statement of grounds of appeal, the appellant maintained the main request and the first and second auxiliary requests underlying the decision under appeal.

V. A summons to oral proceedings was issued. In a communication under Article 15(1) RPBA 2020, the board gave the following preliminary opinion:

- The "*method of encoding and decoding video data*" of claim 1 of the main request was unclear (Article 84 EPC) because its attempt to cover both an encoding method and a decoding method with the same wording led to confusion and inconsistencies. Essentially the same objection applied to the device of claim 14 of the main request and to the independent claims of the first and second auxiliary requests.
- The board was inclined to concur with the appellant that the subject-matter of the claims of the main request and the first and second auxiliary requests was not rendered obvious by prior-art documents D1, D2 and D3.

VI. With a letter dated 7 December 2023, the appellant filed amended claims according to a new main request, which were to replace the claims of the previous main request.

VII. The board then cancelled the oral proceedings.

VIII. The appellant's final requests were 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 7 December 2023 or, alternatively, on the basis of the claims of the first or second auxiliary requests underlying the decision under appeal.

IX. Independent claims 1, 13, 15 and 16 of the appellant's **main request** read as follows:

"1. A method of decoding video data, the method comprising:

storing, by a video decoder and in a reference picture buffer, previously reconstructed blocks of a current picture of the video data, the reference picture buffer also storing one or more blocks of pictures other than the current picture available for inter-prediction;

including the current picture in a reference picture list used during prediction of blocks of the current picture, wherein the reference picture list also includes an indication of one or more pictures other than the current picture available for inter-prediction; and

decoding, by the video decoder and based on the reference picture list, a first block of video data in the current picture based on a predictor block of video data, wherein the predictor block is one of the previously reconstructed blocks of the current picture stored in the reference picture buffer."

"13. A method of encoding video data, the method comprising:

storing, by a video encoder and in a reference picture buffer, previously reconstructed blocks of a

current picture of the video data, the reference picture buffer also storing one of more blocks of pictures other than the current picture available for inter-prediction;

including the current picture in a reference picture list used during prediction of blocks of the current picture, wherein the reference picture list also includes an indication of one or more pictures other than the current picture available for inter-prediction; and

encoding, by the video encoder and based on the reference picture list, a first block of video data in the current picture based on a predictor block of video data, wherein the predictor block is one of the previously reconstructed blocks of the current picture stored in the reference picture buffer."

"15. A device for decoding video data comprising:

means for storing, in a reference picture buffer, a previously reconstructed block of a current picture of the video data, the reference picture buffer also storing one of more blocks of pictures other than the current picture available for inter-prediction;

means for including the current picture in a reference picture list used during prediction of blocks of the current picture, wherein the reference picture list also includes an indication of one or more pictures other than the current picture available for inter-prediction; and

means for decoding, based on the reference picture list, a first block of video data in the current picture based on a predictor block of video data, wherein the predictor block is one of the previously reconstructed blocks of the current picture stored in the reference picture buffer."

"16. A device for encoding video data comprising:

means for storing, in a reference picture buffer, a previously reconstructed block of a current picture of the video data, the reference picture buffer also storing one of more blocks of pictures other than the current picture available for inter-prediction;

means for including the current picture in a reference picture list used during prediction of blocks of the current picture, wherein the reference picture list also includes an indication of one or more pictures other than the current picture available for inter-prediction; and

means for encoding, based on the reference picture list, a first block of video data in the current picture based on a predictor block of video data, wherein the predictor block is one of the previously reconstructed blocks of the current picture stored in the reference picture buffer."

Reasons for the Decision

1. The appeal is admissible.

The invention

2. The present invention relates to the encoding and decoding of video data via a specific implementation of Intra Block Copying (Intra BC). Intra BC is a prediction mode for blocks of a picture by reference to other blocks of the same picture. It is a prediction mode distinct from the so-called intra-prediction and inter-prediction modes.

Main request - Article 123(2) EPC

3. The board is satisfied that the amendments made to independent claims 1, 13, 14 and 15 of the main request are based on the application as filed, in particular on Figures 3 and 5 and the corresponding description.

Main request - Article 84 EPC

4. The board is satisfied that the claims of the main request meet the requirements of Article 84 EPC. The amendments made to the claims of the main request overcome the clarity objections raised by the board in its communication pursuant to Article 15(1) RPBA 2020.

Main request - inventive step (Articles 52(1) and 56 EPC)

5. In the Reasons for the decision under appeal, the examining division held that the subject-matter of the independent claims of the main request then on file did not involve an inventive step in view of the disclosure of prior-art document D1.
6. For the reasons given below, the board concurs with the appellant that the subject-matter of the independent claims of the main request is not obvious in view of document D1.
7. Relevance of document D1
 - 7.1 Document D1 was published 12 years before the earliest priority date of the current application.

It discloses an additional coding mode for coding macroblocks in intra-frames as well as intra-macroblocks of inter-frames (see section 1 of D1). The

additional coding mode corresponds to what became known later, but before the earliest priority date of the current application, as the Intra Block Copying (Intra BC) coding mode. The fact that Intra BC was well known and was introduced into the HEVC draft specification (see document D3) before the earliest priority date of the current application is acknowledged in the description of the application as filed (see, for instance, paragraphs [0022] to [0024]) and has not been disputed by the appellant.

According to the Intra BC coding mode, a block in the current picture is predicted using a motion vector from another block, like in the inter-prediction mode. However, in contrast to the inter-prediction mode, the other block is not in another picture but in the current picture itself.

- 7.2 Document D1 does not mention a "*reference picture list*" to which the current picture would be added when coding in the Intra BC mode.
- 7.3 The method of claim 1 thus differs not only by the step of including the current picture in a reference picture list, as acknowledged by the examining division (see point 1 of the Reasons for the decision under appeal), but also by the feature that the subsequent step of coding a block based on a predictor block of the current picture is "*based on the reference picture list*".
- 7.4 According to the examining division (see points 6.3 and 6.4 of the Reasons for the decision), in D1, when the current picture is a B-frame or P-frame and Intra BC is used for intra-macroblocks and inter-prediction from one or more other reference pictures is used for inter-

predicted macroblocks, the skilled person would necessarily have to index the current picture and the other reference picture(s) in a reference picture list.

- 7.5 The board is not convinced by this argument for the following reasons:

For inter-prediction, the reference pictures are not the current picture. They therefore need to be identified. This is conventionally achieved by indexing them in a reference picture list, so that the decoder knows which reference pictures to use.

For Intra BC, the sole reference picture is the current picture itself. The decoder knows this and thus the current picture does not need to be in the reference picture list used for inter-prediction.

- 7.6 The examining division also argued (see point 6.4 of the Reasons for the decision) that the skilled person would have been prompted to add the current picture to a reference picture list by the following sentences in section 1 of D1:

"This document proposes a new approach to improve Intra macroblock coding by using motion compensation technique for video coding."

"In our current work, [...] we just chose to keep the motion estimation algorithm the same as for the P frame types, requiring thus only a limited amount of modifications to the JVT verification model."

"All techniques for motion compensation including different motion modes, motion vector coding as well as

the bitstream syntax used in the JVT standard can be used for this new approach."

- 7.7 In the board's view, the above sentences teach using a motion compensation technique for Intra BC similar to that used for inter-prediction, i.e. a technique based on motion estimation, motion vectors, block matching and motion compensation. However, they do not suggest storing the current picture in a reference picture list with the reference pictures for inter-prediction.

As explained under point 7.5 above, the step of adding the current picture to the reference picture list for inter-prediction is not necessary in D1. It would thus only be undertaken by the skilled person if they had a good reason to do so, i.e. for solving a technical problem. No such technical problem is mentioned in D1, in particular not the technical problems mentioned in paragraphs [0025] and [0055] of the description of the application as filed.

8. Relevance of document D3

- 8.1 Document D3 is a draft specification of the HEVC standard approximately one year before the earliest priority date of the current application.

D3 discloses an Intra BC mode (see, for instance, *intra_block_copy_enabled_flag* on page 70 and *intra_bc_flag* on page 90). It also discloses an inter-prediction mode using a reference picture list (see, for instance, sections 3.118 to 3.120 and 8.3.4). However, in the 322 pages of document D3, there is not a single passage disclosing or suggesting an interaction between the Intra BC mode and the reference picture list.

Hence, in the board's view, document D3 does not suggest using the reference picture list for Intra BC, let alone adding the current picture to the reference picture list.

8.2 Since neither D1 nor D3 suggests adding the current picture to the reference picture list for Intra BC, a combination of D1 and D3 does not lead to that feature either.

9. Closest prior art

The examining division held document D1 to be the closest prior art. The appellant argued that document D3 should be regarded as the closest prior art.

In the board's view, both D1 and D3 are suitable starting points for assessing inventive step. However, for the reasons given above, the claimed subject-matter is not rendered obvious regardless of whether the starting point is document D1 or document D3.

10. Relevance of document D2

Document D2 summarises the technical contributions to the draft HEVC standard from the end of July 2013 (the previous JCT-VC meeting) and the end of October 2013, i.e. approximately six to nine months before the earliest priority date of the current application. A large number of these technical contributions concern Intra BC (see, in particular, section 6.1.5). However, none of these contributions appears to make a link between Intra BC and the reference picture list.

The board thus regards document D2 as an indication that using the reference picture list of inter-prediction for Intra BC without a teaching in that direction was not obvious to the skilled person shortly before the earliest priority date.

11. Conclusion on inventive step

In light of the above, the board considers that the subject-matter of the claims of the main request is not rendered obvious by the prior art cited by the examining division in the decision under appeal.

12. Conclusion on the main request

For the reasons set out above, the board concludes that the appellant's main request is allowable.

Since the main request is held to be allowable, there is no need for the board to decide on the lower-ranking requests.

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 with the order to grant a patent in the following version:
 - Claims: Nos. 1 to 17 of the main request filed with the letter dated 7 December 2023
 - Description: Pages 1 to 54 as originally filed
 - Drawings: Sheets 1/8 to 8/8 as originally filed

The Registrar:

The Chair:



K. Boelicke

B. Willems

Decision electronically authenticated