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**Datasheet for the decision
of 8 October 2024**

Case Number: T 1341/21 - 3.5.04

Application Number: 13835357.8

Publication Number: 2894853

IPC: H04N19/463

Language of the proceedings: EN

Title of invention:

IMAGE ENCODING METHOD, IMAGE DECODING METHOD, IMAGE ENCODING
DEVICE, IMAGE DECODING DEVICE, AND IMAGE ENCODING AND DECODING
DEVICE

Applicant:

Sun Patent Trust

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (no)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 1341/21 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 8 October 2024

Appellant: Sun Patent Trust
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Representative: Grünecker Patent- und Rechtsanwälte
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 26 May 2021
refusing European patent application
No. 13835357.8 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair B. Willems
Members: M. Paci
B. Müller

Summary of Facts and Submissions

I. The appeal is against the examining division's decision refusing European patent application No. 13835357.8, published as international patent application WO 2014/038130 A1.

II. The documents cited in the decision under appeal included the following two prior-art documents:

D2: B. Bross et al.: "High efficiency video coding (HEVC) text specification draft 8", Joint Collaborative Team on Video Coding (JCT-VC) of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11, 10th Meeting, Stockholm, Sweden, 11 to 20 July 2012, no. JCTVC-J1003, 23 July 2012, XP030112947

D7: US 2012/0140815 A1

III. The decision under appeal was based on the following grounds:

- the subject-matter of claim 1 of the main request and the second auxiliary request then on file did not involve an inventive step in view of document D2 alone or in combination with document D7
- the subject-matter of claim 1 of the first auxiliary request then on file did not involve an inventive step in view of document D6 alone or in combination with document D7
- the subject-matter of claim 1 of the third auxiliary request then on file did not involve an inventive step in view of any of the following combinations of documents:
 - D2 and D9

- D2, D7 and D9
- D9 and D7

IV. The applicant (appellant) filed a notice of appeal. In its statement of grounds of appeal, the appellant provided arguments to support its opinion that the claims of the main request underlying the decision under appeal met the requirements of Article 56 EPC.

V. A summons to oral proceedings was issued. In a communication under Article 15(1) RPBA, the board gave the preliminary opinion that the method of claim 1 of the appellant's main request did not involve an inventive step in view of document D2 combined with document D7.

VI. The board held oral proceedings on 8 October 2024.

During the oral proceedings, the appellant presented its arguments on the issue of inventive step regarding claim 1 of the main request.

The appellant's final request was 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 underlying the decision under appeal.

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

VII. Claim 1 of the appellant's **main request** reads as follows:

"An image coding method for coding an image comprising a plurality of blocks, each block comprising a

plurality of coefficients, said method comprising the steps:

quantizing the plurality of coefficients of each block in the image; and

coding coefficient information indicating the plurality of coefficients and quantization information, wherein the quantization information includes (i) a first flag indicating whether or not quantization matrices are used in the quantizing step, and if the first flag indicates that quantization matrices are used in the quantizing step, (ii) a second flag indicating whether or not the quantization matrices used in the quantizing step are included in a sequence parameter set, and (iii) a third flag indicating whether or not the quantization matrices used in the quantizing step are included in a picture parameter set, and

wherein, when the blocks are quantized in the quantizing step using flat matrices, the following is coded as the quantization information: (i) the first flag indicating that quantization matrices are not used in the quantizing step,

characterized in that

when the blocks are quantized in the quantizing step using only a plurality of default matrices, the following are coded as the quantization information: (i) the first flag indicating that quantization matrices are used in the quantizing step, (ii) the second flag indicating that the quantization matrices used in the quantizing step are not included in the sequence parameter set, and (iii) the third flag indicating that the quantization matrices used in the quantizing step are not included in the picture parameter set."

Reasons for the Decision

1. The appeal is admissible.

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

2. Closest prior art

The appellant did not dispute that document D2 may be regarded as the closest prior art for the subject-matter of claim 1 (see first paragraph of section III of the statement of grounds of appeal, affirmed during the oral proceedings before the board).

Document D2 is specification draft 8 of the HEVC standard.

3. Disclosure of document D2 and distinguishing features

It is common ground between the appellant and the examining division that the method of claim 1 differs from that of document D2 on account of the features in the characterising portion of the claim (see point 11.2 of the Reasons for the decision and the second paragraph of section IV of the statement of grounds of appeal), namely the following distinguishing features:

"when the blocks are quantized in the quantizing step using only a plurality of default matrices, the following are coded as the quantization information: (i) the first flag indicating that quantization matrices are used in the quantizing step, (ii) the second flag indicating that the quantization matrices used in the quantizing step are not included in the sequence parameter set, and (iii) the third flag indicating that the quantization matrices used in the

quantizing step are not included in the picture parameter set."

The board concurs. Document D2 discloses the following three flags corresponding to the first to third flags of claim 1, respectively:

"scaling_list_enable_flag" (see last line on page 31 and middle of page 68),

"sps_scaling_list_data_present_flag" (see second line on page 32 and middle of page 68) and

"pps_scaling_list_data_present_flag" (see line 28 on page 33 and the paragraph bridging pages 71 and 72).

However, document D2 does not disclose using these flags as stated in the distinguishing features to indicate that only a plurality of default matrices are used in the quantising step.

The board also notes that the disclosure of document D2 specifies an image decoding method, but not the corresponding image encoding method (see point 3.48 of D2). However, an image encoding method having the inverse steps of the image decoding method of claim 1 may be regarded as implicitly disclosed in D2.

4. Objective technical problem

4.1 The examining division stated the following:

"D2 does not specify how the decoder should handle the combination of flags in the above distinguishing feature. In particular, in the SPS of D2 (§7.3.2.2, in particular page 31, last line - page 32, line 4), the second flag (sps_scaling_list_data_present_flag) is only coded when the first flag (scaling_list_enable_flag) is '1'. Therefore, the codec designers have foreseen a case where a scaling list has

to be used, but no scaling list is present in the SPS. However, in D2 this would formally lead to an error, as the decoder would have to use an unspecified scaling list." (see point 11.4 of the Reasons for the decision).

The examining division thus considered that, for a person skilled in the art of video coding, it was evident that the signalling scheme in D2 was either incomplete or sub-optimal. Therefore, the skilled person would have been inclined to seek an improvement to the signalling scheme for the scaling lists of D2. Hence, the objective technical problem could be formulated in general terms as how to improve the quantisation matrix signalling of D2 (see point 11.6 of the Reasons for the decision).

- 4.2 The appellant submitted that the examining division's formulation was incorrect (see second full paragraph on page 6 of the statement of grounds of appeal, affirmed during the oral proceedings before the board) and that the objective technical problem should be formulated as "*how to improve the coding efficiency of D2*" (see first full paragraph on page 5 of the statement of grounds of appeal).

The appellant's arguments regarding the formulation of the objective technical problem may be summarised as follows (see section IV of the statement of grounds of appeal).

- (a) The distinguishing features significantly improved coding efficiency by indicating that default quantisation matrices were used. This technical effect should be reflected in the formulation of the objective technical problem.

(b) The fact that D2 did not disclose how the decoder would handle the combination of flag values in the distinguishing features was not an error because the encoder would never insert such a combination of flag values into the bitstream.

4.3 The board agrees with the appellant for the reasons set out below.

Re argument (a)

Document D2 discloses a mechanism for indicating in the bitstream that default quantisation matrices are used. It is done by syntax element "*scaling_list_pred_matrix_id_delta*" being set equal to 0 in the data structure "*scaling_list_param()*" which is transmitted in the SPS (sequence parameter set) or the PPS (picture parameter set) when one of the second and third flags is not equal to 0 (see page 32, line 4; page 33, line 30; section 7.3.2.4 and section 7.4.2.4).

The board concurs with the appellant that this mechanism of D2 is less efficient in terms of coding than the one in the distinguishing features which does not require additional syntax elements.

Re argument (b)

Document D2 does not indicate what the decoder should do when both the second flag ("*sps_scaling_list_data_present_flag*") and the third flag ("*pps_scaling_list_data_present_flag*") are equal to 0.

However, the board agrees with the appellant that this is because this combination of flag values is not used

in D2. The encoder would not be expected to insert such a combination of flag values into the bitstream. Hence, the board is not convinced by the examining division's argument that the skilled person would regard this as an error.

- 4.4 For the above reasons, the board agrees with the appellant's formulation of the objective technical problem, i.e. *"how to improve the coding efficiency of D2"*.
5. Obviousness in view of document D2 in combination with document D7
- 5.1 Document D7, like document D2, concerns the HEVC standard which was under development before the filing date of document D2. Document D7, like document D2, focuses on the quantisation matrices.
- 5.2 The examining division pointed out that document D7 disclosed two flags ("*seq_scaling_matrix_present_flag*" in paragraph [0079] and "*pic_scaling_matrix_present_flag*" in paragraph [0084]) corresponding to the second and third flags ("*sps_scaling_list_data_present_flag*" and "*pps_scaling_list_data_present_flag*") of document D2. Moreover, paragraph [0079] of D7 taught setting the value of the flag "*seq_scaling_matrix_present_flag*" equal to 0 to indicate that default quantisation matrices were used at the SPS level. When the value of the flag "*pps_scaling_list_data_present_flag*" was also equal to 0, it indicated that the default quantisation matrices were used at the PPS level.

The examining division held that the skilled person applying the teaching of document D7 to the method of

document D2 would directly arrive at the distinguishing features of claim 1 (see points 11.9 to 12.2 of the Reasons for the decision).

5.3 The appellant submitted the following arguments as to why the skilled person would not have considered combining the teaching of document D7 with that of document D2 and, even if they did, would not have arrived at the method of claim 1.

(1) As acknowledged in paragraphs [0021] and [0022] of D7, document D7 was based on the first specification draft of the HEVC standard and the contribution of D7 had not been adopted in subsequent specification drafts of the HEVC standard. Therefore, the skilled person who was thoroughly familiar with the ongoing development of the HEVC standard would not have considered document D7 as a possible source of information for solving the objective technical problem, namely the problem of improving the coding efficiency of the HEVC text specification draft 8 (i.e. of document D2). Moreover, the skilled person would have understood that D7 was no longer compatible with D2, because D2 already included an alternative solution to the teaching of D7. The skilled person would thus not have considered a combination of D2 and D7 (see section V of the Reasons).

(2) The disclosure of document D7 was mostly concerned with the compression of quantisation matrices, with the signalling of quantisation matrices - i.e. the relevant part of D7 - being a side issue only mentioned in a few paragraphs of document D7. This provided an additional reason why the skilled person would not have selected document D7 and would not have combined its teaching with that of document D2.

(3) Paragraph [0079] of document D7 disclosed that the "*pic_scaling_matrix_present_flag*" (corresponding to the second flag in claim 1) being equal to 0 "*indicates that the default quantization matrices are used*" and paragraph [0084] of document D7 disclosed that the "*pic_scaling_matrix_present_flag*" (corresponding to the third flag in claim 1) being equal to 0 "*indicates that the quantization matrices specified in SPS are used*". As a consequence, when the second flag was equal to 0, the third flag could not also be equal to 0 because there were in that case no "*quantization matrices specified in SPS*". In other words, document D7 did not disclose having **both** the second and third flags set to 0 to indicate that "*the quantization matrices used in the quantizing step are not included in the sequence parameter set*" **and** that "*the quantization matrices used in the quantizing step are not included in the picture parameter set*" as set out in claim 1.

6. For the reasons set out below, the board concurs with the examining division that the skilled person would have arrived at the subject-matter of claim 1 without an inventive step by applying the teaching of paragraphs [0079] and [0084] of D7 to the method of D2.

The flags "*seq_scaling_matrix_present_flag*" (in paragraph [0079]) and "*pic_scaling_matrix_present_flag*" (in paragraph [0084]) in document D7 correspond to the second and third flags ("*sps_scaling_list_data_present_flag*" and "*pps_scaling_list_data_present_flag*") of document D2. When these two flags are both equal to 0, it signals that only default quantisation matrices are used, both at the SPS level and at the PPS level, and that

quantisation matrices are not included in either the SPS or the PPS.

In other words, document D7 teaches that the use of default quantisation matrices can be signalled efficiently by using the above two flags. This teaching is directly applicable to the method of D2, which uses similar flags and does not use this combination of values for any other signalling. The skilled person would therefore have wanted to apply the above teaching of D7 to the method of D2 in order to obtain more coding-efficient signalling and would thus have arrived at the method of claim 1 without an inventive step.

The board does not find the appellant's arguments in point 5.3 above persuasive for the following reasons.

Re argument (1)

The relevant teaching in paragraph [0079] of D7 concerns the signalling of the quantisation matrices used. It is largely independent of the nub of the disclosure of D7, which concerns the compression of quantisation matrices. There is no incompatibility between the signalling in D7 and the signalling in D2 which would have led the skilled person to disregard document D7 as irrelevant.

There may be many reasons why the technical proposals in document D7 were not adopted in subsequent specification drafts of the HEVC. Hence, the board does not agree that the skilled person would have disregarded document D7 as a possible source of relevant information.

Re argument (2)

Document D7, like document D2, relates to quantisation matrices. For that reason alone, the skilled person would have regarded document D7 as potentially relevant. By reading D7, the skilled person would have found the relevant passages relating to the signalling of quantisation matrices.

Re argument (3)

Paragraph [0084] of D7 comprises the following two sentences:

"In this pseudo code, pic_scaling_matrix_present_flag=0 indicates that the quantization matrices specified in SPS are used. Otherwise, the quantization matrices of SPS may be overwritten by the ones encoded in the PPS."

The board considers that the skilled person would have understood from those two sentences that quantisation matrices used in the quantising step were not included in the sequence parameter set when the third flag ("*pic_scaling_matrix_present_flag*") was equal to zero. When the second flag ("*sps_scaling_list_data_present_flag*") was also equal to zero, the skilled person would have understood that the default quantisation matrices used at the SPS level would also be used at the PPS level.

7. Conclusion on inventive step

For the above reasons, the board is of the view that the method of claim 1 of the main request does not involve an inventive step in view of document D2 in combination with document D7.

8. Conclusion on the main request

Since the subject-matter of claim 1 does not involve an inventive step, the main request is not allowable.

Conclusion

9. Since the main and sole request is not allowable, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



U. Bultmann

B. Willems

Decision electronically authenticated