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**Datasheet for the decision
of 30 October 2018**

Case Number: T 2353/12 - 3.5.04

Application Number: 07867967.7

Publication Number: 2127390

IPC: H04N7/26

Language of the proceedings: EN

Title of invention:

DETECTING BLOCK ARTIFACTS IN CODED IMAGES AND VIDEO

Applicant:

Thomson Licensing

Headword:

Relevant legal provisions:

EPC Art. 56

RPBA Art. 13(1), 15(3)

EPC R. 115(2)

Keyword:

Non-attendance at oral proceedings

Inventive step - (no)

Late-filed auxiliary requests - admitted (no)

Decisions cited:

T 1587/07, T 1990/07

Catchword:



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Case Number: T 2353/12 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 30 October 2018

Appellant: Thomson Licensing
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 14 June 2012
refusing European patent application
No. 07867967.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman C. Kunzelmann
Members: A. Dumont
T. Karamanli

Summary of Facts and Submissions

- I. The appeal is against the decision of the examining division to refuse European patent application No. 07 867 967.7.
- II. The examining division issued a decision according to the state of the file referring to its two previously issued communications. In these communications, it held *inter alia* that the subject-matter of claim 1 then on file lacked an inventive step over:
 - D1: SHIZHONG LIU et al., "Efficient DCT-Domain Blind Measurement and Reduction of Blocking Artifacts", IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY, IEEE SERVICE CENTER, PISCATAWAY, NJ, US, December 2002, Vol. 12, No. 12, ISSN 1051-8215, XP011071905, pages 1139 to 1149.
- III. The applicant filed notice of appeal and a statement of grounds of appeal including claims according to a main request and first and second auxiliary requests.
- IV. In a communication annexed to the summons to oral proceedings, the board *inter alia* expressed the provisional opinion that the subject-matter of claim 1 according to all requests then on file lacked an inventive step starting from D1 as the closest prior-art document.
- V. With letter dated 27 September 2018, the appellant submitted a response and two additional sets of claims, identified as the "third request" and "fourth request" (hereinafter "third auxiliary request" and "fourth auxiliary request", respectively). It further submitted that the order of all the requests then on

file or the withdrawal of any of them depended on the admission of these newly filed auxiliary requests into the appeal proceedings.

VI. In a communication dated 5 October 2018, the board *inter alia* informed the appellant that, under Article 13(1) RPBA, the boards of appeal had discretion to admit and consider any amendment to a party's case after it has filed its grounds of appeal. The board further noted that the requests on page "1" of the appellant's letter of 27 September 2018 were not unambiguous, especially if only one of the third and fourth auxiliary requests were to be admitted into the appeal proceedings.

VII. By letter dated 11 October 2018, the appellant filed amended claims according to a new third auxiliary request and made a statement which reads as follows:

"It is requested that the third and fourth requests are admitted in the procedure of appeal. If the Board of Appeal agrees with admitting both the third and fourth requests in the procedure of appeal, then the main and first requests filed on 22.10.2012 are withdrawn and the third and fourth requests become respectively the main and first requests to be examined by the Board of Appeal.

If the Board of Appeal agrees with admitting only one of the third or fourth requests in the procedure of appeal, then the main request filed on 22.10.2012 is withdrawn and the admitted request become the main request to be examined by the Board of Appeal. First and second requests filed on 22.10.2012 remain to be examined."

VIII. In a letter dated 19 October 2018, the appellant informed the board that it would not be attending the oral proceedings.

IX. In the oral proceedings on 30 October 2018, the board considered that, in view of the appellant's statement made in the letter dated 11 October 2018, it was appropriate to decide first on the admission of the third auxiliary request as filed by letter dated 11 October 2018 and the fourth auxiliary request as filed by letter dated 27 September 2018. After deliberation, the board, exercising its discretion under Article 13 RPBA, did not admit the third auxiliary request as filed by letter dated 11 October 2018 and the fourth auxiliary request as filed by letter dated 27 September 2018 into the appeal proceedings.

X. In view of this finding of the board and the appellant's statement, the appellant's requests are as follows:

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request as filed with the statement of grounds of appeal, or, in the alternative, of one of the first or second auxiliary requests as filed with the statement of grounds of appeal, or the third auxiliary request as filed by letter dated 11 October 2018 or the fourth auxiliary request as filed by letter dated 27 September 2018.

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

"A method for detecting block artifacts, comprising:

identifying (910) a plurality of overlapping blocks in a picture from a sequence of moving video pictures with respect to a current block, where each one of said plurality of overlapping blocks covers a portion of the current block and a portion of an adjacent block; transforming (920) said at least one of the plurality of overlapping blocks into respective coefficients corresponding to at least one of a luminance component and a chrominance component; and identifying (930) that the current block includes a block artifact when one or more of said respective coefficients corresponding to the at least one of the plurality of overlapping blocks are larger than a value."

- XII. Claim 1 according to the first auxiliary request differs from claim 1 according to the main request in that the first step of the method reads as follows, the difference with respect to claim 1 of the main request being underlined:

"identifying (910) a plurality of overlapping blocks in a reconstructed version of a picture from a sequence of moving video pictures with respect to a current block, where each one of said plurality of overlapping blocks covers a portion of the current block and a portion of an adjacent block;"

- XIII. Claim 1 according to the second auxiliary request differs from claim 1 according to the first auxiliary request by the addition of the following feature before the final full stop:

", wherein a false identification of the block artifact is eliminated and wherein said eliminating is performed when the transform coefficients of a particular one of

the plurality of overlapping blocks in the reconstructed version of the picture is [sic] less than, by an amount, the transform coefficients of a collocated block for the particular one of the plurality of overlapping blocks in an original version of the picture".

XIV. Claim 1 according to the third auxiliary request differs from claim 1 according to the second auxiliary request by replacing the expression "larger than a value" by "larger than a threshold value" and by adding the following feature before the final full stop:

" , the method further comprising:
generating (265) a blockiness artifact map that specifies a location of the blocking artifact in the reconstructed version of the picture,
performing (270) feature detection on at least one of an original version and a reconstructed version of the picture, wherein feature detection is performed on color, texture or location; and
performing (275) feature based artifact correction on the blockiness artifact map to generate a feature-enhanced blockiness artifact map".

XV. Claim 1 according to the fourth auxiliary request differs from claim 1 according to the second auxiliary request in that the expression "larger than a value" has been replaced by "larger than a threshold value" and the following feature has been added before the final full stop:

"determining a blockiness value for a block boundary between a first block and a second block in the picture, including:

accessing lines of pixels, each of the lines of pixels having pixels from the first block and the second block,
determining a respective filtered value for each of the lines of pixels, and
determining the blockiness value for the block boundary in response to the filtered values, the determining the blockiness value excluding a minimum or a maximum of the filtered values; and
determining an artifact strength of the block artifact responsive to at least one of the identifying a block artifact and the determined blockiness value".

XVI. The reasoning as regards inventive step in the communications referred to in the impugned decision, where relevant for the present decision, may be summarised as follows:

- D1 (Figure 2 and sections II and III on pages 1140 to 1143) disclosed using overlapping blocks and DCT transform with thresholding of coefficient values to identify block artifacts (see point 1.2 in the Written Opinion of the International Searching Authority (WOISA), which the communication of 9 March 2012 refers to).
- Limiting claim 1 to state that both luminance and chrominance were used in artifact identification would be obvious (see points 5.2 and 6 in the communication of 9 March 2012).
- As regards false artifact identification: it was obvious to use original data, if available, to eliminate false artifact identification by comparison with a reconstructed version, using some kind of threshold (see points 5.1 and 5.4 in the communication of 9 March 2012 and point 2.2 in the WOISA).

XVII. The appellant's arguments in support of inventive step, where relevant for the present decision, may be summarised as follows:

- The invention was based on the observation that, if an image had a block artifact, then one low-frequency coefficient (e.g. F01 or F10 for an MPEG4 DCT transform) had a large value. This differed from the approach in D1, where an artifact was modelled as a 2-D step function. D1 did not provide any hint at the simplification of the identifying step as in the invention, resulting in lower computational complexity.

XVIII. The appellant's arguments in support of admission of the third and fourth auxiliary requests into the appeal proceedings, where relevant for the present decision, may be summarised as follows:

- The amendments proposed in the third and fourth auxiliary requests were in response to the objections raised by the board of appeal against the second auxiliary request.
- More specifically, the objection of lack of inventive step was overcome in claim 1 of the third auxiliary request by the addition of the features of claims 4 and 5 of the second auxiliary request together with a feature from the description (*"wherein feature detection is performed on color, texture or location"*).
- More specifically, the objection of lack of inventive step was overcome in claim 1 of the fourth auxiliary request by the addition of features supported by the description, page 15,

line 29, to page 17, line 16, as well as page 17, lines 19 to 30, together with figure 2.

Reasons for the Decision

1. The appeal is admissible.
2. As announced in advance, the duly summoned appellant did not attend the oral proceedings. However, under Rule 115(2) EPC, the proceedings were allowed to continue in its absence.

According to Article 15(3) and (6) RPBA, the board shall "not be obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned who may then be treated as relying only on its written case" and "ensure that each case is ready for decision at the conclusion of the oral proceedings, unless there are special reasons to the contrary."

Furthermore, the purpose of oral proceedings is to give the party the opportunity to present its case and to be heard. However, a party gives up that opportunity if it does not attend the oral proceedings. This view is supported by the explanatory note to Article 15(3) RPBA (former Article 11(3) RPBA) which reads: "This provision does not contradict the principle of the right to be heard pursuant to Article 113(1) EPC since that Article only affords the opportunity to be heard and, by absenting itself from the oral proceedings, a party gives up that opportunity" (see CA/133/02 dated 12 November 2002).

Moreover, the board agrees with the finding of decision T 1587/07 that an appellant who submits amended claims as a new request after oral proceedings have been arranged but does not attend these proceedings must expect a decision not to admit the new request into the appeal proceedings pursuant to Article 13 RPBA in its absence (point 2.2 of the Reasons).

3. *Main request: inventive step (Article 56 EPC)*

3.1 It is common ground that document D1 discloses a method comprising the first two steps of claim 1, in particular with the step of transforming overlapping blocks ("shifted block" in D1, Figure 2) into luminance (DCT) coefficients. The step of identifying a block artifact in D1 relies on a comparison of a compound "visibility" value (η) with a threshold value (τ) to determine whether a serious artifact is present (see for instance the Type-I and Type-II categories in D1, page 1142, right-hand column). D1 takes activity masking and brightness masking into account to compute a visibility function on the basis of the DCT coefficients in the overlapping block.

3.2 By contrast, the present invention directly compares (one or more individual) transform coefficient(s) in the overlapping block with a threshold value (see also the present application, page 14, lines 21 to 23). The subject-matter of claim 1 is thus novel over D1.

3.3 Artifact detection relies in both D1 and the invention on the detection of a transition in the middle of the overlapping block. It is common general knowledge that such a step function has particular properties in the transform domain (see also the present application, page 13, lines 15 to 18). Detecting such a function

based on one (single) DCT coefficient is thus an obvious, albeit rudimentary method. The question arises as to whether the skilled person would simplify the known method to arrive at the claimed invention. The board agrees with the appellant that using a single transform coefficient will entail lower computational complexity. However, artifact detection will then also be less reliable than in the more refined method known from D1. Finding the right trade-off between computational simplicity and reliability is a routine measure for a person skilled in the art. The trade-off is explained in principle in D1: see for instance the last three paragraphs in section I on page 1140.

The appellant has not commented on this argument, which was included in the board's preliminary opinion given in its communication annexed to the summons to oral proceedings.

- 3.4 In conclusion the subject-matter of claim 1 according to the main request lacks an inventive step over D1 combined with common general knowledge and thus does not meet the requirements of Article 56 EPC.
4. *First auxiliary request: inventive step (Article 56 EPC)*
 - 4.1 Claim 1 according to the first auxiliary request differs from claim 1 according to the main request in that it makes it clear that the picture is a reconstructed version. This corresponds to the case dealt with in D1 (see first paragraph of section II on page 1140: "In practice, the original images will not be available").

- 4.2 In conclusion, the subject-matter of claim 1 according to the first auxiliary request lacks an inventive step over D1 combined with common general knowledge for the same reasons as claim 1 according to the main request. Thus the requirements of Article 56 EPC are not met.
5. *Second auxiliary request: inventive step (Article 56 EPC)*
- 5.1 Claim 1 according to the second auxiliary request essentially corresponds to claim 1 on which the decision under appeal was based. It differs from claim 1 according to the first auxiliary request by the addition of the features set out in claims 7 and 9 as originally filed (see also the description, page 23, lines 15 to 19).
- 5.2 D1 mentions in the first paragraph in section III that a block transition was falsely identified as an artifact when its visibility was less than a threshold value, for reconstructed images. The examining division addressed the issue of false identification in the communication of 9 March 2012 (see points 5.1 and 5.4 thereof) and in the WOISA (see point 2.2 thereof) and took the view that, if an original version of the image was available, then a direct comparison between a reconstructed version and the image at the edge of blocks was an obvious solution. The board confirmed this assessment in its preliminary opinion given in the communication annexed to the summons to oral proceedings. The appellant has not provided any specific argument in support of inventive step on the basis of these additional features of the claimed invention during the appeal proceedings.

5.3 As a result, the board has no reason to depart from the assessment made by the examining division and confirmed in the board's preliminary opinion.

5.4 In conclusion the subject-matter of claim 1 according to the second auxiliary request lacks an inventive step over D1 combined with common general knowledge and thus does not meet the requirements of Article 56 EPC.

6. *Third auxiliary request: admission (Article 13(1) RPBA)*

6.1 Article 13(1) RPBA provides that "*[a]ny amendment to a party's case after it has filed its grounds of appeal ... may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.*" Thus, the board has discretion to admit any amendment to an appellant's case after it has filed its grounds of appeal.

6.2 An important aim of Articles 12 and 13(1) RPBA is that the parties' submissions are concentrated at as early a stage as possible so that the case is as complete as possible when it comes to processing it. Therefore, amendments to the claims are to be filed at the earliest possible moment.

6.3 In the present case, the third auxiliary request was filed after the appellant had filed its statement of grounds of appeal, so that the board has to decide how to exercise its discretion under Article 13(1) RPBA. The board also notes that, compared with claim 1 according to the second auxiliary request, claim 1 was amended mainly by the addition of features of dependent

claims 4 and 5, together with a feature ("*wherein feature detection is performed on color, texture or location*") taken exclusively from page 18, lines 20 to 24, of the description as filed.

- 6.4 As far as complexity is concerned, the amendments involve three options taken from the description in combination with features taken from two dependent claims, thereby increasing the technical complexity of the subject-matter submitted.
- 6.5 As far as procedural economy is concerned, an amendment at a late stage in the appeal proceedings is justifiable if it is an appropriate and immediate reaction to unforeseeable developments in the previous proceedings which do not lie within the responsibility of the party submitting the amendment, for instance a new objection raised by the board (see T 1990/07, point 7 of the Reasons).
- 6.6 In the present case, the appellant argued that the third auxiliary request was based on the second auxiliary request and that the amendments to claim 1 were made to overcome the objections raised by the board against the second auxiliary request in the communication annexed to the summons.
- 6.7 Indeed, in its communication annexed to the summons, the board raised as its only objection in respect of the second auxiliary request that the subject-matter of claim 1 lacked an inventive step over D1 combined with common general knowledge. However, in doing so, the board did thereby not raise a new objection but merely confirmed the objection raised by the examining division based on D1. It follows that the filing of the third auxiliary request cannot be considered as an

appropriate and immediate reaction to unforeseeable developments in the previous appeal proceedings. In conclusion, submitting amendments to claim 1 to overcome objections raised by the examining division merely in reaction to the summons to oral proceedings before the board is also not in the interests of procedural economy.

6.8 For these reasons, the board exercised its discretion under Article 13(1) RPBA and did not admit the third auxiliary request into the appeal proceedings.

7. *Fourth auxiliary request: admission (Article 13(1) RPBA)*

7.1 Compared with claim 1 according to the second auxiliary request, claim 1 was amended by adding a plurality of features derived from passages of the description (page 15, line 29 to page 17, line 16 as well as page 17, lines 19 to 30, together with Figure 2). This increases the technical complexity of the subject-matter submitted.

7.2 The further reasons given in the previous section also apply to claim 1 according to the fourth auxiliary request.

7.3 As a result, the board exercised its discretion under Article 13(1) RPBA and did not admit the fourth auxiliary request into the appeal proceedings.

8. Since none of the appellant's admitted requests is allowable, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



K. Boelicke

C. Kunzelmann

Decision electronically authenticated