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**Datasheet for the decision
of 22 November 2012**

Case Number: T 0722/09 - 3.5.04

Application Number: 04752135.6

Publication Number: 1665801

IPC: H04N7/26

Language of the proceedings: EN

Title of invention:

VIDEO ENCODING METHOD AND SCENE CUT DETECTION METHOD

Applicant:

APPLE INC.

Headword:

Relevant legal provisions:

EPC 1973 Art. 84, 54, 111(1)

Keyword:

Novelty - after amendment

Decisions cited:

Catchword:



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Case Number: T 0722/09 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 22 November 2012

Appellant: APPLE INC.
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Cupertino, CA 95014 (US)

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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 10 November 2008 refusing European patent application No. 04752135.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: F. Edlinger
Members: R. Gerdes
B. Müller

Summary of Facts and Submissions

- I. The appeal is against the decision of the examining division to refuse European patent application No. 04 752 135.6.
- II. The examining division held in the decision under appeal that the subject-matter of claim 1 was not new (Article 54(1) and 54(2) EPC), that claim 1 did not clearly define the matter for which protection was sought (Article 84 EPC) and that the two independent claims 1 and 15 did not comply with Rule 43(2) EPC. The prior art disclosed in each of the following documents was considered as relevant for novelty:
- D3: US 5 592 226 A
- D4: Simon, M. M. et al.: "Improved quality video coding for CBR transmission: bit production control and pre-analysis", XP010165266
- D5: Lan, A. Y. et al.: "Scene-Context-Dependent Reference-Frame Placement for MPEG Video Coding", XP000824572.
- III. The applicant appealed against this decision and filed amended claims.
- IV. With a letter dated 22 October 2012, the appellant submitted new claims in reply to the board's communication accompanying the summons to oral proceedings.
- V. Oral proceedings were held before the board on 22 November 2012. At the end of the oral proceedings the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis

of claims 1 to 8 according to the main request, or of claims 1 to 8 of one of the auxiliary requests I or II all filed with a letter dated 22 October 2012.

VI. Independent claim 1 of the main request reads as follows:

"A method of processing a plurality of *frames* to determine a number of bidirectional motion compensated (B) *frames* to be encoded in a set of successive *frames* in the plurality of *frames*, the method comprising:

in a first pass of operations:

a) computing motion vectors for each particular *frame* in the set of successive *frames* after a first *frame*, wherein the computed motion vectors for each particular *frame* are based only on the particular *frame* and *the first frame*;

b) determining a first motion cost value for each of at least *two frames* in the set of successive *frames*;

c) determining a second cost value based on the first motion cost value for at least one *frame* in the set of successive *frames*, wherein the second cost value is a first motion cost value of a *frame* divided by a first motion cost value of an immediately preceding *frame*;

d) determining the number of B-*frames* to be encoded in the set of successive *frames* based on the second cost value; *and*

in a second pass of operations:

encoding the set of successive frames by (i) using the determined number of B-frames and (ii) using all the motion vectors computed in the first pass of operations."

[The text in *italics* indicates amendments made during the appeal proceedings.]

- VII. The wording of the claims according to the first and second auxiliary requests has no bearing on this decision.
- VIII. The reasons given in the decision under appeal, in so far as they are relevant for the amended claims under consideration, may be summarised as follows:

D3 disclosed a method of processing a plurality of video pictures to determine a number of bidirectional motion compensated video pictures to be encoded in a set of successive video pictures. D3 also disclosed the steps of computing motion vectors for each particular video picture in the set of successive video pictures after a first video picture, wherein the computed motion vectors for each particular video picture were based only on the particular video picture and a preceding video picture. In addition, first and second cost values for at least one video picture were computed and the number of B-video pictures was computed based on the second cost value (see point 1.1 of the Reasons). Hence, the subject-matter of independent claim 1 then on file lacked novelty (Article 54(1) and (2) EPC).

These features were also disclosed in D4 (see decision under appeal, point 1.2 of the Reasons) and D5 (see point 1.3 of the Reasons).

In addition, it was not clear (Article 84 EPC) what qualified as "second cost value" and, consequently, it was "not clear how step (c) of the method limits the scope of the claim" (see point 2 of the Reasons). In particular, the claim allowed for the second cost value to be equal to the first cost value, a case that was also mentioned in the description as a possible implementation (see page 8, lines 9 and 10 of the application).

The two independent claims 1 and 15 in the same category did not comply with Rule 43(2) EPC (see point 3 of the Reasons).

IX. The appellant's arguments with respect to the claims of the main request may be summarised as follows:

The expression "second motion cost value" was clarified to be "a first motion cost value of a frame divided by a first motion cost value of an immediately preceding frame" and the second independent claim was deleted. These amendments overcame the objections under Article 84 EPC and Rule 43(2) EPC.

Claim 1 required that - in a first pass of operations - motion vectors for each particular frame after a first frame be based only on the particular frame and the first frame. All motion vectors computed in the first pass were used in a second pass of operations.

None of D3 to D5 disclosed computing motion vectors with respect to a first frame in a first pass and reusing all of the computed motion vectors in a second pass of operations. In addition, the subject-matter of

claim 1 was distinguished from D3 to D5 by the particular method of determining the second cost value.

Hence, the subject-matter of claim 1 was new.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments (Article 123(2) EPC)*
 - 2.1 Claim 1 of the main request relates to the embodiment of the invention shown in figure 11 and described on page 31, line 3 to page 32, line 13. It is derivable from claims 1, 5, 8, 11, 12 and 13 and figure 11 as originally filed. The feature that the computed motion vectors for each particular frame are based only on the particular frame and the first frame is disclosed in figure 9 together with page 27, line 16 to page 28, line 8 and page 31, lines 3 to 14.
 - 2.2 Hence the board finds that claim 1 of the main request complies with Article 123(2) EPC.
3. *Clarity (Article 84 EPC 1973)*
 - 3.1 Claim 1 of the main request has been amended to specify that "the second cost value is a first motion cost value of a frame divided by a first motion cost value of an immediately preceding frame". This amendment overcomes the objection under Article 84 EPC in the decision under appeal. The board has no further objection regarding the clarity of claim 1.

3.2 The objection under Rule 43(2) EPC raised in the decision under appeal has been overcome by deleting the second independent claim in the same category.

4. *Novelty (Articles 54(1) and (2) EPC 1973)*

4.1 Present claim 1 specifies that in the first pass of operations the number of B-frames is determined based on a specific choice of the second cost value (feature c)), and in the second pass of operations the determined number of B-frames is used and all motion vectors computed in the first pass are used to encode the set of successive frames.

4.2 D3 discloses a method for the determination of I-, P-, and B-frames in a sequence of successive frames (see figure 3: 10 together with column 10, lines 15 to 34 and figure 9: 38) which is carried out in a first pass of operations before performing operations of a motion compensation encoder. Motion vectors are computed between successive frames f_c and f_{c-1} as well as between each particular frame f_c and a first frame f_{ref} (see figure 4: 103, 104 together with column 10, line 53 to column 11, line 11, and figure 10: 103, 104' together with column 14, lines 15 to 23). If the distance or relative movement between the particular frame and the first frame $D(f_{ref}, f_c)$ exceeds a threshold T_0 , the frame f_{c-1} is encoded as a P-frame with intermediate frames being encoded as B-frames. D3 also discloses an optimal spacing algorithm (OSA, see figure 11 together with column 17, lines 23 to 62) computing a first cost value d_i and a second cost value d_{ev} based on the first motion cost value.

D3 does not disclose the specific choice of the second cost value as being a first motion cost value of a

frame divided by a first motion cost value of an immediately preceding frame. D3 also does not disclose how the motion vectors in the second pass of operations, i.e. in the motion compensation encoder, are computed.

- 4.3 D4 also relates to an encoding method for the determination of I-frames in a sequence of successive frames, the determination of frame types being carried out in a pre-analyser before performing operations of a motion compensation encoder (see page 842, left-hand column, last paragraph to right-hand column, first paragraph). D4 discloses the determination of forward motion vectors for a first motion cost value $dist(n)$ and a second cost value $(dist(n) - dist(n+1)) / dist(n)$ based on the first motion cost value. D4 also discloses that motion vectors computed in the pre-analyser "are stored, to be used in coding" (see page 844, right-hand column, last paragraph to page 845, left-hand column, first paragraph).

D4 at least does not disclose that the motion vectors for each particular frame are based only on the particular frame and the first frame.

- 4.4 Also D5 discloses a method for the determination of I-, P-, and B-frames in a sequence of successive frames (see figures 1, 2 and 4 together with page 481, chapter "Picture-Type Decision") which is carried out in a first pass of operations before performing operations of a motion compensation encoder. According to D5, motion vectors between subsequent frames are computed in the first pass of operations. These motion vectors are employed to determine a first motion cost value for each particular image and a second cost value based on the first motion cost value (see figure 4: $|MV|$ and

accum_motion). The motion vectors between subsequent frames of the first pass of operations are reused in the second pass of operations "to perform local motion tracking" and to thus "trace the path of motion from the current frame to its reference" (see page 488, left-hand column, last paragraph and page 482, chapter "Motion-Vector Interpolation").

D5 does not disclose the computation of motion vectors between each particular frame and the first frame in the first pass of operations and the specific choice of the second cost value.

4.5 It follows that the subject-matter of claim 1 is new (Article 54(1) and (2) EPC 1973) with respect to the disclosure in each of D3 to D5.

5. *Remittal (Article 111(1) EPC 1973)*

5.1 Thus the reasons given in the decision under appeal for refusing the application do not apply to present claim 1 of the main request, and the decision under appeal must consequently be set aside. However, a patent cannot be granted at the present stage of the proceedings because the examination as to the other requirements of patentability, such as inventive step (Article 56 EPC 1973) over the available documents, has not been carried out for present claim 1 of the main request.

5.2 Under these circumstances the board exercises its discretion under Article 111(1) EPC 1973 in remitting the case to the first instance for further prosecution.

5.3 In view of the above there is no need for the board to consider the appellant's first and second auxiliary 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 for further prosecution.

The Registrar:

The Chairman:



K. Boelicke

F. Edlinger

Decision electronically authenticated