Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 12 November 2020

Case Number: T 2295/15 - 3.5.04

Application Number: 09820314.4

Publication Number: 2338281

IPC: H04N7/26, H04N13/00

Language of the proceedings: EN

Title of invention:
SHARING OF MOTION VECTOR IN 3D VIDEO CODING

Applicant:
Nokia Technologies Oy

Headword:

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

Keyword:
Main request - added subject-matter (yes)
Auxiliary request - inventive step (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2295/15 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 12 November 2020

Appellant: (Applicant)	Nokia Technologies Oy Karakaari 7 02610 Espoo (FI)
Representative:	Berggren Oy, Tampere Visiokatu 1 33720 Tampere (FI)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 31 July 2015 refusing European patent application No. 09820314.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	B. Müller
Members:	A. Seeger
	B. Le Guen

Summary of Facts and Submissions

I. The appeal is against the examining division's decision to refuse European patent application No. 09 820 314.4, published as international patent application WO 2010/043773 A1.

II. The documents cited in the decision under appeal included the following:

D3: Philipp Merkle et al: "*Efficient Compression of Multi-View Depth Data Based on MVC*", 2007 3DTV Conference, IEEE, 7-9 May 2007, pages 1-4, XP031158214, ISBN: 978-1-4244-0721-7

III. The application was refused on the following grounds.

(a) Claim 1 of the then main request and the then first auxiliary request did not meet the requirements of Article 84 EPC in combination with Rule 43(1) and (3) EPC because essential features were missing.

(b) The subject-matter of claim 1 of the then main request, the then first auxiliary request and the then second auxiliary request lacked inventive step (Article 56 EPC).

IV. The applicant ("appellant") filed notice of appeal. With the statement of grounds of appeal, the appellant filed claims according to a main request and an auxiliary request. The appellant submitted that the claims of the main request had been amended on the basis of claims 8 to 14 of the former main request, and that the claims of the auxiliary request corresponded

to claims 4 to 6 of the former second auxiliary request.

V. The board issued a summons to oral proceedings. In a communication under Article 15(1) of the revised Rules of Procedure of the Boards of Appeal (RPBA 2020, OJ EPO 2020, Supplementary publication 2) annexed to the summons, the board expressed the preliminary opinion that claim 1 according to the main request did not meet the requirements of Article 123(2) EPC and that the subject-matter of claim 1 according to both the main request and the auxiliary request did not involve an inventive step within the meaning of Article 56 EPC.

VI. By letter dated 12 October 2020, the appellant filed amended claims according to a main request and an auxiliary request, replacing the previous main request and the previous auxiliary request, respectively.

VII. On 12 November 2020, the board held oral proceedings. The appellant's final requests were that the decision under appeal be set aside and a European patent be granted on the basis of the claims of the main request or, in the alternative, on the basis of the claims of the auxiliary request, both requests filed by letter dated 12 October 2020. 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 method of decoding a scalable multiview video coding (SMVC) bitstream including

- a first view comprising a first texture picture, and a first depth map picture associated with the first texture picture,

- a second view comprising a second texture picture without any depth map picture associated with the second texture picture,

- a third view comprising a third texture picture, and a third depth map picture associated with the third texture picture,

wherein the first, second and third texture pictures reside on a base layer of an inter-layer hierarchy and share the same value of a dependency identification, the value being different from zero, the method comprising:

decoding a first motion vector from the bitstream;

decoding a second motion vector from the bitstream;

decoding the third depth map picture belonging to the third view needed for display or view synthesis, wherein the first motion vector is used to predict the third depth map picture from the first depth map picture belonging to the first view; and

decoding the third texture picture needed for display or view synthesis, wherein the second motion vector is used to predict the third texture picture from the first texture picture;

decoding a third and a fourth motion vector from the bitstream; and

decoding the second texture picture needed for display or view synthesis, wherein the third and fourth motion vectors are used to predict the second texture picture from the first and the third texture picture."

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

"A method of decoding a bitstream including a first texture picture, a first depth map picture associated with the first texture picture, a second texture picture and a second depth map picture associated with the second texture picture, wherein the first depth map picture belongs to a first view and the second depth map picture belongs to a second view and the first depth map picture and the second depth map picture are auxiliary pictures coded such that said depth map pictures are independently coded from their associated texture pictures but inter-view prediction between auxiliary pictures in different views is enabled, the method comprising:

decoding a first motion vector from the bitstream;

decoding a second motion vector from the bitstream;

decoding the second depth map picture belonging to the second view, wherein the first motion vector is used to predict the second depth map picture from the first depth map picture belonging to the first view; and

decoding the second texture picture, wherein the second motion vector is used to predict the second texture picture from the first texture picture."

X. The appellant's main arguments relevant to the present decision may be summarised as follows.

(a) The feature "*wherein the first, second and third texture pictures reside on a base layer of an inter-layer hierarchy and share the same value of a dependency identification, the value being different from zero*" in claim 1 according to the main request was based on the description, page 12, lines 17 to 20 and page 14, lines 28 to 31 (see letter dated 12 October 2020, point 1.1). The passage of the description on page 14, lines 28 to 31 had to be understood in a context in which the texture pictures formed the base layer in all views. In this context, all texture pictures on the base layer had the same non-zero dependency_id value, thereby enabling inter-view prediction between them.

(b) In addition to the distinguishing features identified by the board, the subject-matter of claim 1 according to the auxiliary request differed from the disclosure of document D3 in that the depth map pictures were coded as auxiliary pictures (see letter dated 12 October 2020, point 2.2). The person skilled in the art would have construed the expression "auxiliary picture" as defined in the standards H264/AVC and MPEG-C part 3. Auxiliary pictures were coded independently of their associated main pictures. In contrast to the known use of auxiliary pictures, claim 1 specified that inter-view prediction was enabled between auxiliary pictures in different views.

Reasons for the Decision

1. The appeal is admissible.

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

2.1 According to Article 123(2) EPC, "*the European patent application ... may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed*". It is established case law that under this legal provision the parts of a European patent application relating to the disclosure (the description, claims and drawings) can only be amended within the limits of what the person skilled in the art would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of these documents as filed (see Case Law of the Boards of Appeal of the European Patent Office ("Case Law"), 9th edition 2019, II.E.1.1.).

2.2 As a basis for the amendments made to claim 1, the appellant referred in particular to Figure 5d and the corresponding passage of the description on page 12, lines 31 to 33 (see statement of grounds of appeal, point 1.1).

2.2.1 Figure 5d illustrates a case of Scalable Multiview Video Coding (SMVC) where each view has one dependency layer for the texture pictures and some views have a further dependency layer for the depth map pictures (see description, page 12, lines 33 to 35: "*some views, e.g., view 1, have only one dependency layer (the texture video) while other views can have two dependency layers (the depth map as well as the texture video)*").

2.2.2 Claim 1 does not specify that depth map pictures (if existent for a particular view) are organised as a second dependency layer. Hence, the features of the target embodiment related to organising depth map pictures into dependency layers have been deleted.

2.2.3 However, the syntax of dependency layers offers an easy way of signalling the absence of a depth map. The option of an absent depth map is not disclosed when the depth map pictures are transmitted either as auxiliary pictures (see Figure 5a) or as further views with mandatory motion vector prediction between a texture picture and its associated depth map picture (see Figure 5b in combination with the description page 11, lines 18 to 22).

Hence, the board holds that the features related to organising depth map pictures into dependency layers are linked to the feature whereby some views have no associated depth map picture, as shown in Figure 5d.

2.2.4 Therefore, the board concludes that claim 1 contains a generalisation (by effectively deleting the features related to organising depth map pictures into dependency layers) which cannot be directly and unambiguously derived from the application as filed.

2.3 Additionally, claim 1 was amended to specify: "*decoding a third and a fourth motion vector from the bitstream*".

2.3.1 As a basis for this amendment the appellant referred to Figure 5d, which shows arrows from the texture pictures of View 0 and View 2 towards the texture picture of View 1 (see point 1.1 of the appellant's letter dated 12 October 2020).

2.3.2 The board acknowledges that the arrows in Figure 5d imply that a third and fourth motion vector are derived at the decoder. However, it is not directly and unambiguously derivable from the application as filed that these motion vectors are derived by decoding them from the bitstream. There are other ways to derive motion vectors, for example by prediction from other motion vectors.

2.4 Claim 1 was further amended to specify: "*the first, second and third texture pictures reside on a base layer of an inter-layer hierarchy and share the same value of a dependency identification, the value being different from zero*".

2.4.1 As a basis for this amendment the appellant referred to the description, page 14, lines 28 to 31 (see point X(a) above). This passage reads as follows: "*As to the SMVC depth coding, the relevant syntax allows a base layer to have a dependency_id that is not equal to 0 in order to enable inter-view prediction from texture videos (with the same dependency_id value) in different views, when one view does not have depth while the other does have depth.*"

2.4.2 In the board's view, the formulation "*allows a base layer to have a dependency_id that is not equal to zero*" does not lead to the conclusion that the base layer in each view has the same dependency_id value. On the contrary, the wording at the end of the passage – "*when one view does not have depth while the other does have depth*" – suggests that the views are not all treated in the same manner and that the values of their respective base layer dependency_id are set differently.

2.4.3 The appellant argued that the passage of the description on page 14, lines 28 to 31 had to be understood in a context in which the texture pictures formed the base layer in all views. In this context, all texture pictures on the base layer had the same non-zero dependency_id value, thereby enabling inter-view prediction between them (see point X(a) above).

2.4.4 The board is not convinced that the passage of the description on page 14, lines 28 to 31 necessarily applies to a situation in which the texture pictures form the base layer in all views. Firstly, it is not evident why, in that situation, a non-zero dependency_id value is required and not all base layer dependency_id values can be set to zero. Secondly, the quoted passage allows for other interpretations, for example as in the following table:

	Base layer	Enhancement layer
First view	Depth, dependency_id = 0	Texture, dependency_id = 1
Second view	Texture, dependency_id = 1	n/a
Third view	Depth, dependency_id = 0	Texture, dependency_id = 1

Thirdly, as set out under point2.4.2 above, the wording "*when one view does not have depth while the other does have depth*" suggests that the views are not all treated in the same manner and that the values of their respective base layer dependency_id are set differently.

2.4.5 Therefore, the board holds that the quoted passage of the description does not provide a direct and

unambiguous basis for setting the dependency_id of all base layers in all views to the same, non-zero value.

2.5 In view of the findings under points 2.2.4, 2.3.2 and 2.4.5, the board concludes that claim 1 of the main request does not meet the requirements of Article 123(2) EPC.

3. *Auxiliary request - inventive step (Article 56 EPC)*

3.1 According to Article 56 EPC, "*[a]n invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art*". It is established case law that the "problem and solution approach" is an appropriate tool for assessing whether claimed subject-matter fulfils the requirements of Article 56 EPC (see Case Law, I.D.2).

3.2 It is common ground that document D3 represents the prior art closest to the subject-matter of claim 1 in the context of this approach.

3.3 Document D3 discloses compression of both depth map pictures and texture pictures (see D3, abstract: "*efficient compression of multi-view depth data based on our multi-view video coding approach for color data*") using inter-view prediction (see D3, abstract: "*exploit statistical dependencies from both temporal and inter-view reference pictures for prediction*", and Figure 4: "*Multiview coding structure with hierarchical B pictures for both temporal and inter-view prediction*"). In particular, document D3 discloses pictures in at least two different views, with a picture in a second view being decoded using a motion

vector that predicts the picture in the second view from a picture in the first view (see D3, Figure 4, the arrow pointing from view S0 to view S2).

Since each view includes a texture picture and a depth map picture, the depth map picture can be regarded as an "auxiliary picture" associated with the texture picture.

Document D3 is silent on whether texture pictures and depth map pictures are coded independently or jointly.

3.4 Therefore, the subject-matter of claim 1 differs from the disclosure of document D3 in that the depth map pictures and the texture pictures are included in the same data stream and are coded independently of each other.

3.5 However, document D3 hints at integrating texture pictures and depth map pictures into a single format (see D3, section 5. ("*CONCLUSIONS*"), last sentence: "*One future extension for compression of N-view plus N-depth multiview representations could be to integrate the two components into one format*").

3.6 Thus, the objective technical problem to be solved may be formulated as how to integrate texture pictures and depth map pictures into a single format.

3.7 One obvious way of integrating depth map pictures and texture pictures would have been to put them into a single data stream and to code them independently of each other. This method of integration, commonly known as "simulcast coding", is recalled in document D3 in the context of the transmission of multiple views (see D3, page 2, right-hand column, second paragraph).

Therefore, a person skilled in the art would have arrived at the subject-matter of claim 1 on the basis of their common general knowledge.

3.8 The appellant argued (see point X(b) above) that the subject-matter of claim 1 additionally differed from the disclosure of document D3 in that the depth map pictures were coded as auxiliary pictures. The person skilled in the art would have construed the expression "auxiliary picture" as defined in the standards H264/AVC and MPEG-C part 3. Auxiliary pictures were coded independently of their associated main pictures. In contrast to the known use of auxiliary pictures, claim 1 specified that inter-view prediction was enabled between auxiliary pictures in different views.

3.9 The board is not convinced by these arguments. They are based on the assumption that the feature "*auxiliary picture*" in claim 1 is construed as a particular syntax element of a video coding standard. However, the board sees no reason to interpret this feature so narrowly. Claim 1 merely defines an "*auxiliary picture*" as a picture that is associated with a texture picture and coded independently of it. In document D3, a depth map picture is also associated with a texture picture, namely the texture picture which is contained in the same view. Moreover, as explained above in point 3.7, independent coding is an obvious way of integrating texture pictures and depth map pictures into a single format.

3.10 In view of the above, the board concludes that the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

4. *Conclusion*

As a result of the above, none of the appellant's requests is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

K. Boelicke B. Müller

Decision electronically authenticated