Internal distribution code:

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

Datasheet for the decision of 1 August 2019

Case Number: T 1537/13 - 3.5.04

Application Number: 09251080.9

Publication Number: 2109321

IPC: H04N7/26, H04N7/50, G06T5/00, G06T5/20

Language of the proceedings: EN

Title of invention:
Adaptive filtering for bit-depth scalable video codec

Applicant:
Intel Corporation

Headword:

Relevant legal provisions:
EPC Art. 87(1), 56

Keyword:
Priority - transfer of priority right
Inventive step - main and auxiliary request (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 1537/13 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 1 August 2019

Appellant: (Applicant)	Intel Corporation 2200 Mission College Boulevard Santa Clara, CA 95054 (US)
Representative:	Maiwald Patent- und Rechtsanwaltsgesellschaft mbH Elisenhof Elisenstraße 3 80335 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 January 2013 refusing European patent application No. 09251080.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	B. Müller
Members:	B. Willems
	R. Gerdes

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division dated 3 January 2013 refusing European patent application No. 09 251 080.9 pursuant to Article 97(2) EPC. The application was published as EP 2 109 321 A2.

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

D1: Yong Yu et al: "*Improving Compression Performance in Bit Depth SVC with a Prediction Filter*", Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JCT1/SC29/WG11 and ITU-T SG16 Q.6), 26th Meeting: Antalya, TR, 13-18 January 2008, document no. JVT-Z045, 22 January 2008, XP030007334; and

D3: EP 1 841 230 A1.

III. The decision under appeal was based on the grounds that the subject-matter of claims 1 and 7 to 10 extended beyond the disclosure of the application as filed (Article 123(2) EPC); claims 1 and 7 did not meet the requirements of Article 84 EPC; the subject-matter of independent claims 1 and 7 lacked inventive step over the combined disclosures of D1 and D3 and the common general knowledge of the person skilled in the art (Article 56 EPC) and the dependent claims did not contain any additional features which, in combination with the features of any claim to which they referred, met the requirements of Article 56 EPC.

IV. The applicant filed notice of appeal. With the statement of grounds of appeal, the appellant submitted amended claims in accordance with a main request and an auxiliary request and requested that the examining

division's decision be set aside and that a European patent be granted on the basis of the claims of the main request or the auxiliary request. The appellant indicated a basis for the amendments in the application as filed and provided reasons as to why the claims of both requests met the requirements of Articles 56, 84 and 123(2) EPC.

V. In a communication under Article 15(1) RPBA (Rules of Procedure of the Boards of Appeal, OJ 2007, 536) the board introduced the following documents into the appeal proceedings:

D4: overview of documents input to the Geneva meeting, list retrieved from the Internet at the URL https://www.itu.int/wftp3/av-arch/jvt-site/2008_04_Geneva/ on 23 January 2019;

D5: Yi-Jen Chiu, Lidong Xu: "*Adaptive (Wiener) Filtering for SVC Bit Depth Scalability*", Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JCT1/SC29/WG11 and ITU-T SG16 Q.6), 27th Meeting: Geneva, CH, 24-29 April 2008, document no. JVT-AA023;

D6: Yi-Jen Chiu, Lidong Xu: "*Adaptive (Wiener) Filtering for SVC Bit Depth Scalability*", Joint Video Team (JVT) of ISO/IEC MPEG & ITU-T VCEG (ISO/IEC JCT1/SC29/WG11 and ITU-T SG16 Q.6), 27th Meeting: Geneva, CH, 24-29 April 2008, presentation at the Geneva meeting, XP030007366.

The board noted that the current application mentioned a priority claim from application US 12/082,561. Since the US application was filed in the name of the designated inventors of the current application, the

earlier application and the current application appeared to be filed by different (natural and legal) persons. Therefore, the appellant was invited to prove that it was the successor in title in respect of the US application. Failing to do so, the date of filing would be the effective date of the current application and documents D5 and D6 would be prior art under Article 54(2) EPC.

Furthermore, the board gave the following provisional opinion.

- Claim 1 of the main request and the auxiliary request did not meet the requirements of Article 56 EPC because the claimed subject-matter lacked inventive step over the disclosure of D1 combined with the common general knowledge of the person skilled in the art.

- Claim 1 of the main request and the auxiliary request did not meet the requirements of Article 56 EPC because the claimed subject-matter lacked inventive step over the combined disclosures of documents D5 and D6 and the common general knowledge of the person skilled in the art.

VI. The appellant did not file a reply to the objections raised in the board's communication. On 18 July 2019 it announced by telephone that it would not be attending the oral proceedings.

VII. On 1 August 2019, the board held oral proceedings in the absence of the appellant.

The chairman noted that it appeared from the file that 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 or the auxiliary request, both requests filed with the statement of grounds of appeal.

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 for scalable video coding comprising:

increasing (20) the bit depth of encoded baseline layer video information;

characterised by:

adaptive filtering (24) the increased bit depth encoded baseline layer video information using a Wiener filter (24), wherein the taps thereof are set according to type of video, which type of video is determined by analysing pixel intensity in a portion of a video picture, a video picture as a whole, or a plurality of successive video pictures; and

providing said filtered increased bit depth baseline layer video information to an enhancement layer encoder (28)."

IX. Claim 1 of the auxiliary request reads as follows (the additional wording is in *italics*):

"A method for scalable video coding comprising:

increasing (20) the bit depth of encoded baseline layer video information;

characterised by:

adaptive filtering (24) the increased bit depth encoded baseline layer video information using a Wiener filter (24), wherein the taps thereof are set according to type of video, *be it graphics or stream view type of video*, which type of video is determined by analysing pixel intensity in a portion of a video picture, a video picture as a whole, or a plurality of successive video pictures; and

providing said filtered increased bit depth baseline layer video information to an enhancement layer encoder (28)."

X. The examining division's arguments, where relevant to the present decision, are summarised below.

(a) D1 was the closest prior art for the assessment of inventive step (see decision under appeal, Reasons, point 3.1.1).

(b) The subject-matter of claim 1 of the main request and the auxiliary request differed from the disclosure of document D1 in that the claimed adaptive filter was a Wiener filter, with the taps set according to the type of video determined by analysing pixel intensity (see decision under appeal, Reasons, point 3.1.2).

(c) The technical problem to be solved might be defined as how to improve the filtering of the baseline layer reconstructed picture in terms of picture quality (see decision under appeal, Reasons, point 3.1.4).

(d) The person skilled in the art would substitute the filter known from D1 with an adaptive Wiener filter (see decision under appeal, Reasons, point 3.1.5.1).

XI. The appellant's arguments, where relevant to the present decision, are summarised below.

(a) D1 disclosed selecting a filter rather than determining filter coefficients for an adaptive filter (see statement of grounds of appeal, page 3, fourth paragraph).

(b) The person skilled in the art seeking to provide improved efficiency and picture quality would not substitute the filter known from D1 with an adaptive Wiener filter (see statement of grounds of appeal, page 3, last paragraph).

(c) The person skilled in the art was not aware of any relationship between pixel intensity distribution (e.g. histograms) and video types (see statement of grounds of appeal, page 3, last sentence).

Reasons for the Decision

1. The appeal is admissible.

2. *Validity of priority*

2.1 According to Article 87(1) EPC, "*any person who has duly filed [...] an application for a patent [...] or his successor in title, shall enjoy, for the purpose of filing a European patent application in respect of the same invention, a right of priority during a period of*

twelve months from the date of filing of the first application".

It is established case law that any party claiming a priority right has to be able to show that it was entitled to that right (see Case Law of the Boards of Appeal of the European Patent Office, 8th edition 2016, II.D.2.2).

2.2 The current application claims priority of application US 12/082,561. This US application was filed in the name of the designated inventors of the current application. Hence, the earlier application and the current application are filed by different (natural and legal) persons.

The appellant failed to submit evidence that it was the successor in title in respect of the above US application. Consequently, no priority rights are acknowledged for the present application in the current proceedings.

2.3 Thus the date of filing is the effective date of the current application and documents D5 and D6 are prior art under Article 54(2) EPC.

3. *Main and auxiliary request - inventive step over D1 (Article 56 EPC)*

3.1 In accordance with the examining division's analysis (see point X(a) above), the reasoning set out below is based on D1 as the closest prior art for the assessment of inventive step.

3.2 D1 discloses a method for scalable video coding (see D1, title), the method comprising the following steps:

increasing the bit depth of encoded baseline layer video information (see page 1, "*Introduction*" and "Tone mapping-1" in the figure on page 2);

adaptive filtering of the increased bit depth encoded baseline layer video information (see page 1, "*Abstract*": "*applying a filter to the reconstructed image from the lower layer*" and "*Introduction*"; page 1, third paragraph: "*we are adding a difference prediction block (see figure below) that tries to predict the difference between the image after inverse tone mapping and input to 10 or 12 bit images*"; page 2: "*The difference prediction is based on the difference [in pixel intensity] between current and either horizontal or vertical neighbor pixels*"), and

providing said filtered increased bit depth baseline layer video information to an enhancement layer encoder (see the figure on page 2: "*p'(i,j)*" is provided to the enhancement layer encoder "*2 LSB coding texture only*").

3.3 The subject-matter of claim 1 of the main request and the auxiliary request differs from the disclosure of document D1 in that the claimed adaptive filter is a Wiener filter, with the taps set according to the type of video determined by analysing pixel intensity (see points X(b) and XI(a) above).

3.4 Thus, the technical problem to be solved may be identified as how to improve the filtering of the baseline layer reconstructed picture in terms of picture quality (see point X(c) above).

3.5 Contrary to the appellant (see point XI(b) above), the board agrees with the examining division that the person skilled in the art would substitute the filter known from D1 with an adaptive Wiener filter (see point X(d) above).

Although D3 teaches using a Wiener filter for a particular purpose, it also demonstrates the common general knowledge relating to Wiener filters. According to paragraphs [0056] to [0058], "*Wiener filters are designed to minimize a mean-square error between the output of the filter and a desired uncorrupted signal*". The filter parameters of the adaptive Wiener filter are derived from the corrupted image data.

Therefore, the person skilled in the art would consider applying an adaptive Wiener filter to the output of the inverse tone mapping table to minimise the mean-square error between the output of the filter and the uncorrupted 10-bit or 12-bit signal.

D1 discloses that the difference prediction, i.e. the filter coefficients, depends on the intensity distribution in the 8-bit image. D3 discloses that the filter taps are derived from the corrupted image data. Therefore, the person skilled in the art subjecting the output of the inverse tone mapping known from D1 to Wiener filtering would consider determining the taps of the filter based on the pixel intensity distribution of the corrupted image.

The board has not been persuaded by the appellant's argument that the person skilled in the art is not aware of any relationship between pixel intensity distribution (e.g. histograms) and video types (see point XI(c) above).

3.6 In view of the above, claim 1 of the main request and claim 1 of the auxiliary request do not meet the requirements of Article 56 EPC because the claimed subject-matter lacks inventive step over the disclosure of D1 combined with the common general knowledge of the person skilled in the art.

4. *Main and auxiliary request - inventive step over D5 and D6 (Article 56 EPC)*

4.1 Document D5 may also be considered as the closest prior art for the assessment of inventive step.

4.2 Document D5 discloses a method for scalable video coding comprising (see page 1, "*Abstract*": "*This document presents an adaptive (Wiener) filtering scheme for SVC bit depth scalability*"):

increasing the bit depth of encoded baseline layer video information (see Figure 1, "*Inverse Tone Mapping (ITM)*"; page 2, "*Description of the approach*": *"The BL video reconstruction is then inputted into the phase of inverse tone mapping to convert the format into the high bit depth*");

adaptive filtering of the increased bit depth encoded baseline layer video information using a Wiener filter (see Figure 1, "*Adaptive Filtering*"; page 2, "*Description of the approach*": "*We propose the module of the adaptive (Wiener) filter to reduce the prediction errors between the EL input and the inverse tone mapped BL reconstruction*"); and

providing said filtered increased bit depth baseline layer video information to an enhancement layer encoder (see Figure 1, "*Enhancement Layer Encoder*").

Document D6, page 21, suggests adaptively selecting the Wiener filter coefficients based on the image contents. As set out in point 3.5 above, it is well known that pixel intensity distributions characterise video types. Therefore, the person skilled in the art would select the filter coefficients based on the content type, as determined by pixel intensity distributions.

4.3 In view of the above, claim 1 of the main request and claim 1 of the auxiliary request do not meet the requirements of Article 56 EPC because the claimed subject-matter lacks inventive step over the combined disclosures of documents D5 and D6 and the common general knowledge of the person skilled in the art.

5. Since neither of the appellant's 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 B. Müller

Decision electronically authenticated