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Datasheet for the decision of 5 October 2006

Case Number: T 0562/03 - 3.5.01

Application Number: 96940379.9

Publication Number: 0862835

IPC: H04N 7/26, H04N 7/58, H04N 7/46

Language of the proceedings: EN

Title of invention:
Method and apparatus for modifying encoded digital video for improved channel utilization

Applicant:
IMEDIA CORPORATION

Opponent:
-

Headword:
Modifying encoded video/IMEDIA CORPORATION

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step over the prior art considered by the first instance (yes, after amendment)"
"Remittal to first instance for further prosecution"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0562/03 - 3.5.01

D E C I S I O N
of the Technical Board of Appeal 3.5.01
of 5 October 2006

Appellant: IMEDIA CORPORATION
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 21 October 2002 refusing European application No. 96940379.9 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: S. Steinbrener
Members: W. Chandler
P. Schmitz

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division to refuse the application on the grounds that, apart from being unclear, not concise and lacking unity, the subject-matter of the independent claims did not involve an inventive step (Article 56 EPC) having regard inter alia to EP-A-0 515 101 (Dl), considered to be the closest prior art, and EP-A-0 661 885 (D2).

II. In the grounds of appeal, the appellant gave reasons why the decision should be set aside. In reply to the communication accompanying the summons to oral proceedings, in which the Board essentially agreed with the reasoning given in the decision, the appellant submitted a main request and first to fifth auxiliary requests, each with a single amended independent claim.

III. At the oral proceedings, the appellant requested that the decision under appeal be set aside and a patent granted on the basis of the main request filed during the oral proceedings, or the second to fifth auxiliary requests filed with the reply to the summons, dated 29 August 2006, renumbered as first to fourth auxiliary requests, or to remit the case to the department of first instance. At the end of the oral proceedings, the Chairman announced the decision.

IV. Claim 1 of the main request reads as follows:
"A method of preventing underflow of any decoder buffer in a digital video signal transmitting and receiving system when transmitting a multiplex (205) of a set of one or more encoded program streams (203) over a first channel, each program stream in said set being

decodeable by a corresponding decoder, each corresponding decoder including a corresponding decoder buffer, said decoder buffers having a maximum allowable size, said method comprising the steps of:
(a) selecting from at least one of said encoded program streams encoded pictures to be modified that use bi-directional prediction (1007);
(b) modifying each said selected encoded picture by reducing prediction error data to form a corresponding modified encoded picture, said modified encoded picture (431) having less data than said selected encoded picture (401); and
(c) transmitting the corresponding modified encoded pictures through said first channel in place of the selected encoded pictures (1011);
(d) transmitting the selected encoded pictures through a second channel,
(e) receiving both channels to reconstruct the original encoded program stream as it existed before the pictures were modified."

V. The appellant argued essentially as follows:

D1 did not disclose the idea of manipulating an already encoded data stream (first part of feature (b)) and reducing the data rate to prevent decoder buffer underflow (end of feature (b) and the object of the method).
The copy command disclosed in D2 did not imply reducing prediction error data in B-frames (in feature (b)).

Neither D1 nor D2 disclosed the idea of transmitting the selected pictures, which used bi-directional prediction, through a second channel (feature (d)).

Reasons for the Decision

1. The appeal complies with the requirements referred to in Rule 65(1) EPC and is, therefore, admissible.

2. The application relates to multiplexing packets of data from encoded program streams, e.g. MPEG encoded programs, into a single multiplex. It solves the problem of decoder buffer underflow when the data from an encoder cannot get through to its decoder buffer because of channel congestion (see page 20, first paragraph).

3. The idea of the invention before the examining division was to select and reduce the prediction error data contained in bi-directionally encoded pictures (B-pictures or B-frames) in an MPEG-coded signal (see page 22, second paragraph). Since B-pictures are encoded as differences from anchor pictures on either side, deleting or altering their data does not affect any other pictures in the sequence (see pages 21 to 22).

4. In appeal, independent claim 1 of the main request was amended essentially to specify that the selected B-pictures were transmitted through a second channel so that the original encoded program stream as it existed before the pictures were modified could be reconstructed in the receiver (features (d) and (e)).

5. It is common ground that D1 discloses a method of multiplexing a set of programs according to the opening paragraph of claim 1.

6. The appellant considers that D1 does not disclose the idea of manipulating an already encoded data stream and the object of reducing the data rate to prevent decoder buffer underflow. However, the Board agrees with the examining division at point 4.3 of the decision that the description of the discarding of bits in D1 at page 3, lines 3 to 27 does involve manipulating an already encoded data stream. Moreover, the Board finds that Figure 9 of D1 and the corresponding description at page 8, lines 7 to 20 discloses, in step 807, such discarding of bits from the bit-stream if the test in step 806 determines that *underflow* of the decoder buffer will occur. This is said to be done in a way to minimise any deleterious effects on the image within the frame that might result. Although the appellant argued that the value that was reduced namely E_{i-L}, referred to a situation L frames earlier, the Board considers that the invention must also select from previously encoded frames, and the claim does not specify the time that they were encoded.

If data is discarded, it follows that modified encoded pictures are transmitted (feature (c)).

7. Thus the Board judges that claim 1 differs from D1 by features (a), (b, part), (d) and (e), namely:
(a) selecting encoded pictures that use bi-directional prediction
(b) modifying the selected pictures by reducing prediction error data
(d) transmitting the selected encoded pictures through a second channel, and

(e) receiving both channels to reconstruct the original encoded program stream as it existed before the pictures were modified.

8. The effect of the features considered by the examining division (features (a) and (b) - see also point 3, above) relates to reducing the data rate and hence involves a degradation (albeit minimised) of the image quality, whereas the effect of the new features (features (d) and (e)) is to restore the quality of the image. In the Board's judgment, these effects are mutually exclusive and so they cannot have any interaction that brings about a technical effect in excess of the sum of their individual effects. Thus, the inventive step of the new features can be judged independently from the previous features, both being considered to solve independent partial problems.

9. Concerning reducing the data rate, the Board agrees with the examining division at point 4.4 of the reasons that it is well known in this field that if prioritising of data is required then the B-frame data is the first data that can be sacrificed or removed. D2 supports this and discloses at column 6, lines 13 to 17 an example whereby the amount of encoded data is reduced by replacing B-frame data by a short copy command representing data from a previous frame. The Board judges that the skilled person faced with the problem of reducing the data rate by discarding bits, whilst minimising the degradation of the image would thus consider discarding B-frame (or B-picture) data. The appellant argues that the copy command disclosed in D2 does not imply reducing prediction error data in B-frames as claimed. However, the Board judges that it is

clear that, compared to the original signal of Figure 5(a), the copy commands in Figure 5(b) have replaced the B2, B4, and B8 frame data, and have thus reduced their prediction error data. The Board thus judges that the examining division was correct in finding that the originally claimed features did not involve an inventive step.

10. However, the Board agrees with the appellant that the new idea of transmitting the selected B-pictures over a second channel is not disclosed or suggested in D1 or D2. Thus claim 1 involves an inventive step over D1 and D2.

11. However, this idea is a new aspect of the invention that is not dealt with in the decision under appeal and does not appear to have been considered by the examining division. Accordingly, the Board holds that the subject-matter now claimed has changed to such an extent that it needs further examination in the light of possibly more relevant prior art. Under these circumstances, and given that, in any case, the dependent claims and the description may need to be amended, the Board considers that this work is more appropriately carried out by the first instance.

In particular, the Board notes that the dependent claims may not be consistent with the new claim 1. Furthermore, the description may contain embodiments not covered by the claims, for example the embodiment described at page 33, line 5 to page 34, line 10, which appears to relate, at least partially, to preventing overflow rather than underflow.

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:

P. Cremona S. Steinbrener