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D E C I S I O N
of 28 October 1998

Case Number: T 0937/97 - 3.5.1

Application Number: 92309970.9

Publication Number: 0540358

IPC: H04N 7/137

Language of the proceedings: EN

Title of invention:
Video signal coding apparatus and decoding apparatus

Applicant:
Victor Company of Japan Ltd

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 113(1)

Keyword:
"Novelty (yes)"
"Inventive step (yes)"
"Substantial procedural violation (no)"

Decisions cited:
T 0042/84, T 0051/94

Catchword:
-



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Boards of Appeal

Chambres de recours

Case Number: T 0937/97 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 28 October 1998

Appellant:

Victor Company of Japan, Ltd.
12, Moriya-Cho 3-Chome, Kanagawa-Ku
Yokohama-Shi, Kanagawa-Ken (JP)

Representative:

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Decision under appeal:

**Decision of the Examining Division of the
European Patent Office posted 10 April 1997
refusing European patent application
No. 92 309 970.9 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: A. S. Clelland
C. Holtz

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division to refuse the application on the ground that the subject-matter of independent claim 1 lacked novelty (Articles 52(1) and 54 EPC).

The following document was cited in the decision:

D1: US-A-4 805 017

- II. The appellant (applicant) lodged an appeal against this decision and paid the prescribed fee. In a subsequently received statement of grounds of appeal the appellant requested that the case be remitted back to the examining division and the appeal fee refunded on the ground that a substantial procedural violation had taken place. As a first auxiliary request the appellant asked that a patent be granted on the basis of the claims before the examining division. A second auxiliary request was for grant on the basis of a combination of claims 1 and 2 and a third auxiliary request for grant on the basis of a combination of claims 1 and 4. Oral proceedings were requested for the event that the Board was minded to refuse any of these requests.

- III. In a submission received on 7 January 1998 the appellant filed a revised set of claims of a further auxiliary request; corresponding amendments to the introduction to the description were also filed, together with revised copies of Figures 8 and 9 of the drawings. Additional arguments were advanced as to why the claims of the new auxiliary request were novel and inventive.

IV. In response to a communication from the Board the appellant withdrew all requests except for the auxiliary request filed on 7 January 1998. Correction of a clerical error in this request was made in a submission received on 21 August 1998. The appellant now requests that the decision under appeal be set aside and a patent be granted on the basis of the following documents:

Claims: 1 to 8 as received on 7 January 1998, with the correction to claim 4 received on 21 August 1998

Description: column 1 to column 2 line 54; and column 4 line 44 to column 10 line 52 of the published application; pages 4, 5, 6a, 6b and 6c as received on 7 January 1998
page 6 as received on 21 August 1998

Drawings: Figures 1 to 7 as filed; Figures 8 and 9 as received on 7 January 1998.

V. Claim 1 of the main request reads as follows:

"An apparatus for coding a video signal, comprising:

first coding means (31) for intraframe/field-coding a video signal of a present frame/field to be coded to obtain a coded video signal;

first decoding means (37) for intraframe/field-decoding the coded video signal to obtain a decoded local video signal containing enough data to be displayed as a picture;

memory means (43) for storing a reproduced local video signal containing enough data to be displayed as a picture being reproduced at least one frame/field prior to the present frame/field;

first addition means (47) for adding the decoded local video signal of the present frame/field and the reproduced local video signal, said local video signal being reproduced at least one frame/field prior to the present frame/field to obtain a temporal addition video signal;

subtraction means (33) for subtracting the temporal addition video signal from the video signal of the present frame/field to obtain an error signal;

second coding means (51) for intraframe/field-coding the predictive error signal to obtain a coded predictive error signal;

second decoding means (53) for intraframe/field-decoding the coded predictive error signal to obtain a local decoded predictive error signal; and

second addition means (49) for adding the local decoded predictive error signal and the temporal addition video signal to obtain a reproduced local video signal of the present frame/field; and

multiplexing means (35) for multiplexing the coded video signal and the coded predictive error signal to obtain a multiplexed coded video signal;

wherein the first addition means (47) adaptively varies a composite ratio of the decoded local video signal of the present frame/field and the reproduced local video signal of at least one frame/field prior to the present frame/field based on the motion of pictures between the decoded local video signal and the reproduced local video signal, and adding both the decoded local video signal and the reproduced local video signal to each other according to said composite ratio."

VI. Claim 4 is a further independent claim and reads as follows:

"A predictive decoding apparatus for reproducing a video signal, responsive to a coded video signal and a coded predictive error signal generated based on motion of pictures in the coded video signal and a video signal coded one frame/field or more prior to a present frame/field coded video signal, the apparatus comprising:

first decoding means (77) for intraframe/field-decoding the coded video signal of a present frame/field containing enough data to be displayed as a picture to obtain a decoded video signal;

second decoding means (79) for intraframe/field decoding the coded predictive error signal to obtain a decoded predictive error signal;

memory means (91) for storing a reproduced video signal containing enough data to be displayed as a picture being reproduced at least one frame/field prior to the present frame/field;

addition means (87) for adding the decoded video signal of the present frame/field and the reproduced video signal being reproduced at least one frame/field prior to the present frame/field to obtain a temporal addition video signal;

reproducing means (89) for adding the decoded predictive error signal and the temporal addition video signal, thus reproducing the video signal;

wherein the addition means (87) adaptively varies a composite ratio of the decoded video signal of the present frame/field and the reproduced video signal being reproduced at least one frame/field prior to the present frame/field, and adding both the decoded video signal and the reproduced video signal to each other according to said composite ratio."

VII. Claims 7 and 8 are independent claims respectively directed to methods of coding and decoding a video signal, corresponding to claims 1 and 4.

Reasons for the Decision

1. *Amendments*

1.1 The four independent claims comply with the requirements of the EPC as to clarity and conciseness (Article 84 EPC) and are based on the subject-matter of the application as originally filed. Present claim 1 includes the subject-matter of claims 1 and 4 as filed and additionally specifies features from the originally filed description; although the claim does not explicitly state that the error signal derived from the subtraction means (33) is the predictive error signal, the subsequent reference to the second coding means (51), together with the description, make this clear.

1.2 The amendments to the description also meet the requirements of the EPC.

2. *The Right to Comment, Article 113(1) EPC*

2.1 The appellant argues in the statement of grounds that the examining division committed a substantial procedural violation in refusing the application after a single communication; it is argued that the first communication did not deal with the dependent claims and gave no indication that refusal was likely. Although the request for refund of the appeal fee has been withdrawn the Board considers that the matter should be discussed.

2.2 Reference is made by the appellant to passages in the Guidelines for Examination; the Guidelines are however not legally binding and a failure of the examining division to follow the procedure set out in the Guidelines, assuming for the moment that this was the case, is not of itself a procedural violation unless it also constitutes a violation of a rule or principle of procedure governed by an article of the EPC or one of the Implementing Regulations, (T 42/84, OJ EPO 1988, 251; T 51/94 not published). The issue considered by the Board in the present case is not whether the examining division complied with the Guidelines but whether their decision is based on grounds or evidence on which the appellant has had an opportunity to present comments, Article 113(1) EPC.

2.3 The Board notes that the single communication raised various formal objections to the claims, in particular lack of conciseness, the absence in the independent claims of "essential features" and a lack of clarity in independent claims 10 and 11. Objection of lack of novelty on the basis of the disclosure of D1 was raised against claim 1 and of lack of inventive step against claims 6, 8, 10 and 11.

2.4 The claims filed in response to the communication were amended to meet the formal points and arguments were advanced as to why these claims were novel and inventive. The impugned decision in essence deals only with the question of novelty and reiterates - almost verbatim - the novelty argument in the communication. The appellant's observations are also dealt with. Although reference is made to the absence of "essential features" this is in the context of why the subject-matter of the claims is not considered to distinguish over the disclosure of D1. Having stated why claim 1 is

considered to lack novelty the decision makes "additional remarks" on the other claims, but it is clear that the ground for refusal is lack of novelty of claim 1.

2.5 The decision thus meets Article 113(1) EPC in that it is based on arguments which are derivable from the communication and on which the appellant therefore has had true opportunity to present comments.

2.6 Since the claims now on file differ substantially from those before the examining division, the Board sees no reason to elaborate further on the complaints of the appellant regarding this issue.

3. *Background to the invention*

3.1 Predictive coding and decoding is used to reduce the bandwidth of a TV image and is based on differential pulse code modulation (DPCM), in which only differences from previously sent information are transmitted. The difference signal is derived by delaying a video signal and comparing it with a real time video signal, the difference then being quantized and coded for transmission. The quantization is non-linear so that some signals are finely quantized and others coarsely, to take advantage of the fact that the human eye is less sensitive to detail in moving scenes.

3.2 In predictive coding, bandwidth is reduced further by sending both an encoded video signal and, instead of the difference between successive signals, the difference between a signal and a previously predicted value for the signal, referred to in the application as a predictive error signal. In consequence, both transmitter and receiver must have the same means of prediction so that the predicted signal can be

calculated at both. Figures 1 and 2 of the application respectively show examples of a known coder and decoder making use of prediction. The simplest embodiment of the invention is shown in Figure 3 and includes components corresponding to components in the Figure 1 coder, namely an encoder 51 ("second coding means" in the terminology of the claims), decoder 53 ("second decoding means"), subtracter 33, adder 49 ("second addition means") and frame memory 43 ("memory means"). In essence the invention adds a further layer comprising a further encoder and decoder 31 and 37 respectively and a motion detector 39 which forms part of a predictor. The final output is a multiplexed signal combining the predictive error signal and a coded video signal.

- 3.3 D1 (US-A-4805017) is the only document cited by the examining division. Figure 1 of D1 is in essence the same as the prior art acknowledged at Figure 1 of the application, differing only in being explicitly concerned with so-called data blocks, i.e. groups of pixels. Figure 13 of D1 is relied on by the examining division and adds to Figure 1 a further layer of processing concerned with pixel data. In both Figure 3 of the application and Figure 13 of D1 a motion compensating unit which compares real time and stored video is in effect added in parallel to the basic predictive error signal generation.

4. *Novelty and Inventive step*

- 4.1 Figure 13 of D1 relates to coding apparatus which, using the terminology of claim 1 of the application, comprises first coding means 5 for coding a signal fo, first decoding means 6 to decode the signal, memory means 2 for storing a reproduced local video signal containing enough data to be displayed as a picture

(the decoded image data signal Y'), first addition means 15 (but see point 4.3 below) for adding the decoded signal fo'' , which includes the decoded local video signal, and a prediction signal I to obtain what is arguably a temporal addition video signal $(I+fo'')$, subtraction means 17 for subtracting the signal $(I+fo'')$ from the video signal Y of the present field, second coding means 7 providing a coded predictive error signal $(fo-fo'')$, second decoding means 8 providing a local decoded predictive error signal $(fo-fo'')$, and second addition means 16 for adding the local decoded predictive error signal $(fo-fo'')$ with the signal $(I+fo'')$ to obtain the reproduced local video signal Y' . Although multiplexing means are not explicitly disclosed in D1 it follows from the presence of two outputs to the receiver, the coded video signal fo and the predictive error signal $fo-fo''$, that multiplexing must be provided.

- 4.2 The apparatus of claim 1 differs from the known apparatus in two primary respects: firstly, the claim states that the first addition means add the decoded local video signal to the reproduced video signal whereas in Figure 13 of D1 the adder 15 adds a decoded signal fo'' to the predictor signal I , and secondly the first addition means are specified as "adaptively varying a composite ratio" of the decoded and the reproduced (ie stored) video signals based on picture motion. It is additionally arguable whether in D1 the decoded signal fo'' constitutes a local video signal, since the video signal at the input to the coder 5 initially has the predictor signal I subtracted. Since however the signal fo'' is primarily made up of the video signal the Board does not consider this to be a distinction of substance.

- 4.3 Dealing with the first distinction, the signals supplied to the adder, the Board is in some doubt as to whether the examining division's identification of the adder 15 with the first addition means of claim 1 is correct: according to claim 1 the first addition means serve to add the decoded and reproduced video signals. It therefore seems more appropriate to identify this feature with the prediction unit 20b in Figure 13 of D1. On this interpretation, the Board notes that the undelayed video signal, which the first addition means uses, is in claim 1 a **decoded** local video signal, coded by first coding means 31 and decoded by first decoding means 37, whereas in D1 the raw video signal Y is fed directly to the predictor 20b.
- 4.4 As regards the second distinction, although D1 discloses a motion detector 3 as part of unit 20b there is no suggestion of varying a composite ratio of the decoded and the reproduced (ie stored) video signals based on picture motion in the manner done in the application. The subject-matter of claim 1 is accordingly novel.
- 4.5 Even if the examining division's interpretation of Figure 13 of D1 is followed the Board does not consider that the skilled person would find it obvious to modify the D1 arrangement to supply a delayed video signal to the adder 15. On the alternative interpretation suggested at point 4.3 above the Board can see no reason why the skilled person would be led to use a decoded video signal, for example fo", as an input to the predictor instead of the raw video Y. On either interpretation, the skilled person is not taught by D1 to vary adaptively a composite ratio of decoded and reproduced video signals. Nor is the claimed combination of features derivable from the subject-matter of D1 in combination with any other document cited in the search report.

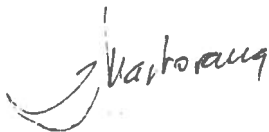
- 4.6 The subject-matter of claim 1 accordingly involves an inventive step.
- 4.7 The feature of varying a composite ratio of decoded and reproduced video signals is also present in the other three independent claims, claims 4, 7 and 8, so that the subject-matter of these claims also involves an inventive step.

Order

For these reasons it is decided that:

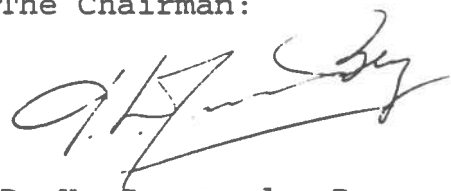
1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent according to the appellant's request.

The Registrar:



P. Martorana

The Chairman:



P. K. J. van den Berg

