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Datasheet for the decision of 3 February 2022

Case Number: T 1035/17 - 3.5.04

Application Number: 13740874.6

Publication Number: 2779645

IPC: H04N19/00

Language of the proceedings: EN

Title of invention:
FRAME RATE CONTROL METHOD, FRAME RATE CONTROL DEVICE, AND FRAME RATE CONTROL PROGRAM

Applicant:
Nippon Telegraph and Telephone Corporation

Headword:

Relevant legal provisions:
EPC Art. 56, 84, 123(2)

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It can be changed at any time and without notic

Keyword:
Claims - clarity (no) - main request, first auxiliary request, second auxiliary request
Inventive step (no) - third auxiliary request, fourth auxiliary request, fifth auxiliary request
Amendments - extension beyond the content of the application as filed (yes) - sixth auxiliary request, seventh auxiliary request, eigth auxiliary request

Decisions cited:

Catchword:

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Case Number: T 1035/17 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 3 February 2022

Appellant: (Applicant)	Nippon Telegraph and Telephone Corporation 5-1, Otemachi 1-chome, Chiyoda-ku, Tokyo 100-8116 (JP)
Representative:	Ahner, Philippe BREVALEX 95, rue d'Amsterdam 75378 Paris Cedex 8 (FR)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 20 December 2016 refusing European patent application No. 13740874.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	T. Karamanli
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. 13 740 874.6, published as international patent application WO 2013/111701 A1.

II. The following document was cited in the decision under appeal:

D1: US 6,751,405 B1

III. The decision under appeal was based on the grounds that claim 1 of the then main request did not meet the requirements of Article 84 EPC and that the subject-matter of claim 1 of the then main request and the then auxiliary request did not involve an inventive step within the meaning of Article 56 EPC in view of the disclosure of document D1 combined with the common general knowledge of the person skilled in the art.

IV. The applicant (appellant) filed notice of appeal. With the statement of grounds of appeal, the appellant filed sets of claims according to first to fourth auxiliary requests. According to the appellant, the claims of the first auxiliary request were identical to the claims of the auxiliary request on which the impugned decision was based. The appellant provided a basis in the application as filed for the subject-matter of the claims of the auxiliary requests as well as arguments why this subject-matter involved an inventive step within the meaning of Article 56 EPC. The appellant did not submit arguments why the decision under appeal was incorrect as far as the main request underlying the decision was concerned. In particular, the statement of

grounds of appeal did not address the objection of lack of clarity raised by the examining division.

V. A summons to oral proceedings was issued on 10 February 2021 and a communication under Article 15(1) of the Rules of Procedure of the Boards of Appeal in the 2020 version (RPBA 2020, see OJ EPO 2019, A63) was issued on 12 October 2021.In that communication, the board expressed the following preliminary opinion.

(a) It appeared that the appellant maintained, as a main request, the main request on which the decision was based.

(b) The board was not minded to take into account the main request in accordance with Article 12(4) RPBA 2007.

(c) The claims of the first to fourth auxiliary requests lacked support by the description (Article 84 EPC).

(d) Should amended claims be filed that overcome the objections raised under Article 84 EPC, the subject-matter of such claims might involve an inventive step.

The board also indicated that the appellant should be prepared to argue for inventive step starting from either document D1 or the Japanese patent application identified in paragraph [0010] of the description of the application in hand as filed. The board further noted that the US family member of this Japanese patent application was published as US 2005/254579 A1 (referred to in the following as document D2).

VI. By letter of reply dated 22 December 2021, the appellant filed amended claims according to a new main request, a new first auxiliary request and a new second auxiliary request. According to the appellant, the new main request was based on the previous first auxiliary request. The previous main request and the previous third auxiliary request were withdrawn.

VII. On 3 February 2022, oral proceedings took place before the board by videoconference, as requested by the appellant in a letter dated 8 December 2021.

During the oral proceedings, the appellant withdrew all requests then on file and filed sets of claims according to the following new requests:

(a) "new main request 1", "new first auxiliary request" and "new second auxiliary request" filed by email at 10.27 hrs ("main request", "first auxiliary request" and "second auxiliary request")

(b) "new main request 1 (2nd submission)", "new first auxiliary request (2nd submission)" and "new second auxiliary request (2nd submission)" filed by email at 11.27 hrs then re-labelled "third auxiliary request", "fourth auxiliary request" and "fifth auxiliary request" by the appellant during the oral proceedings

(c) "new auxiliary request 6", "new first auxiliary request 7" and "new second auxiliary request 8" filed by email at 14.25 hrs ("sixth auxiliary request", "seventh auxiliary request" and "eighth auxiliary request")

The appellant's final requests were that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request filed during the oral proceedings before the board or, alternatively, on the basis of the claims of one of the first to eighth auxiliary requests filed during the oral proceedings before the board.

At the end of the oral proceedings, the chair announced the board's decision.

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

"A frame rate control method for adjusting a frame rate of input video to a frame rate at which an encoder is able to perform encoding, the frame rate control method comprising:

a step of setting a frame rate measurement interval T_i which serves as a reference;

a step of stamping, when each picture of the input video is input to a frame rate control apparatus, a time when each picture of the input video is input on each picture of the input video as a time stamp of each picture of the input video;

a step of determining whether the difference between a time stamp ti of a determination target picture and a time stamp t(i-n-d) of a past picture by (n+d) which is determined by the number of pictures n capable of being encoded by the encoder within the frame rate measurement interval Ti which is the predetermined time and the number of dropped pictures d, exceeds the frame rate measurement interval Ti; and

a step of discarding the determination target picture if the determination target picture is not any one of first to n^{th} input video pictures and the difference is less than or equal to the frame rate measurement interval T_i and designating the determination target picture as an encoding target if the determination target picture is any one of the first to n^{th} input video pictures or the difference is greater than the frame rate measurement interval T_i."

IX. Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the former specifies:

- "a frame rate control method for adjusting a frame rate of input video which is input from an imaging device" instead of "a frame rate control method for adjusting a frame rate of input video"

- "inputting the determination target picture to the encoder" instead of "designating the determination target picture as an encoding target"

X. Claim 1 of the second auxiliary request differs from claim 1 of the main request in that the former specifies:

- "the number of pictures n capable of being input to the encoder" instead of "the number of pictures n capable of being encoded by the encoder"

XI. Claim 1 of the third auxiliary request differs from claim 1 of the main request in that the former specifies:

- "the number of dropped pictures d from the beginning of the input video" instead of "the number of dropped pictures d"

XII. Claim 1 of the fourth and fifth auxiliary requests differs from claim 1 of the third auxiliary request by the same differences as the ones by which claim 1 of the first and second auxiliary requests differs from claim 1 of the main request, respectively.

XIII. Claim 1 of the sixth auxiliary request differs from claim 1 of the main request in that the former specifies:

- "the number of dropped pictures d between a time (ti-T_i) and a time t_i" instead of "the number of dropped pictures d"

XIV. Claim 1 of the seventh and eighth auxiliary requests differs from claim 1 of the sixth auxiliary request by the same differences as the ones by which claim 1 of the first and second auxiliary requests differs from claim 1 of the main request, respectively.

XV. The appellants arguments, where relevant to the present decision, may be summarised as follows.

(a) The expression "*the number of dropped pictures d*" in claim 1 of the main request and the first and second auxiliary requests was clear. Contrary to the statement made under point 5.4.3 of the board's communication under Article 15(1) RPBA 2020, it was not essential that the variable d indicated the number of dropped frames between time (ti - Ti) and time ti. For example, Figure 3 taught that d

represented the number of dropped pictures since the beginning of the video.

(b) The subject-matter of claim 1 of the third, fourth and fifth auxiliary requests involved an inventive step. Irrespective of whether document D1 or document D2 was chosen as the starting point for the assessment of inventive step, the features distinguishing claim 1 from that starting point solved the objective technical problem of controlling the computational complexity of the encoder in a case where the input frame rate fluctuated. Moreover, there was no teaching in the prior art as a whole that would have prompted the person skilled in the art faced with the objective technical problem to arrive at the claimed subject-matter by modifying the disclosure of D1 or D2.

(c) The feature "*the number of dropped pictures d between a time (t_i-T_i) and a time t_i*" in claim 1 of the sixth to eighth auxiliary requests was implicitly disclosed by Figure 1 and its description as well as by the last sentence of paragraph [0040] of the description of the application as filed. The board's counter-arguments based on scenarios differing from the scenario disclosed in Figure 1 of the application - i.e. scenarios in which picture 2 was dropped in addition to picture 5 - were speculative. A possible scenario with reference to Figure 1 was that a single picture was dropped, for example picture 3 instead of picture 5. The comparison target was then picture 2, not picture 1.

Reasons for the Decision

1. The appeal is admissible.

2. All requests - admittance (Article 13(2) RPBA 2020)

In the case in hand, the summons to oral proceedings was notified after the date on which RPBA 2020 entered into force, i.e. 1 January 2020 (Article 24(1) RPBA 2020). Thus, in accordance with Article 25(1) and (3) RPBA 2020, Article 13(2) RPBA 2020 applies to the question of whether to admit the appellant's requests, which were filed after notification of the summons to oral proceedings and are therefore amendments within the meaning of Article 13(2) RPBA 2020.

At the beginning of the oral proceedings, the board raised a new objection under Article 123(2) EPC against the main request then on file. Therefore, there were exceptional circumstances within the meaning of Article 13(2) RPBA 2020 in the case in hand, and the board decided to admit all requests, which had been filed in reaction to that new objection during the oral proceedings, into the appeal proceedings.

3. Main request, first auxiliary request and second auxiliary request - clarity (Article 84 EPC)

3.1 Claim 1 of the main request, the first auxiliary request and the second auxiliary request specifies that the parameter d is "*the number of dropped pictures*".

3.2 The board finds that it is not clear which dropped pictures are meant by this expression. These may be all the pictures of the input video dropped so far (i.e.

until it is determined whether to discard the "*determination target picture*" or designate it as an encoding target) or only those of the input video that were dropped during some time period before the time stamp ti of the "*determination target picture*".

3.3 The appellant's argument that it is not essential that the variable d indicates the number of dropped frames between time (ti - Ti) and time ti (see point XV.(a) above) does not address the issue of what d represents in the context of claim 1.

3.4 The board thus comes to the conclusion that claim 1 of the main request and the first and second auxiliary requests lacks clarity. Therefore, none of these requests meets the requirements of Article 84 EPC.

4. Third auxiliary request, fourth auxiliary request and fifth auxiliary request - inventive step (Article 56 EPC)

4.1 A solution claimed as non-obvious is patentable only if it actually has the alleged effect. If it does not appear credible that the invention as claimed would actually be capable of solving the problem, an objection under Article 56 EPC may be raised, possibly requiring a reformulation of the problem (see Case Law of the Boards of Appeal of the European Patent Office, 9th edition 2019 ("Case Law"), I.D.2).

4.2 Document D1 may be considered the closest prior art for the assessment of inventive step of the subject-matter of claim 1 of the third auxiliary request under the "problem/solution approach".

4.3 The appellant argued that document D1 only disclosed the following features of claim 1: "*A frame rate control method for adjusting a frame rate of input video to a frame rate at which an encoder is able to perform encoding, the frame rate control method comprising a step of setting a frame rate measurement interval T_i which serves as a reference*".

There is no need for the board to consider whether document D1 discloses other features of claim 1 because even if the board agrees with the appellant that document D1 does not disclose any of the remaining features of claim 1, it comes to the conclusion that the claimed subject-matter does not involve an inventive step for the following reasons.

4.4 The appellant formulated the objective technical problem as to control the computational complexity of the encoder in a case where the input frame rate fluctuated.

This formulation of the objective technical problem coincides with paragraph [0016] of the description.

The appellant argued that there was no teaching in the prior art as a whole that would have prompted the person skilled in the art faced with the objective technical problem to arrive at the claimed subject-matter by modifying the disclosure of D1 or D2 (see point XV.(b) above).

4.5 The board finds that the subject-matter of claim 1 does not solve this objective technical problem for the following reasons.

4.5.1 According to claim 1, a difference between a time stamp ti of a determination target picture and a time stamp t(i-n-d) of a past picture by (n+d) is determined. The determination target picture is discarded if the determination target picture is not any of the first to n^{th} input video pictures and the difference is less than or equal to the frame rate measurement interval Ti.

Furthermore, claim 1 specifies d as the number of dropped pictures from the beginning of the input video.

4.5.2 In the processing of the input video by the method specified in claim 1, some pictures will be dropped. Thus, the number of dropped pictures d will increase over time. Hence, the difference between the time stamp ti of the determination target picture and the time stamp t(i-n-d) of a past picture by (n+d) will increase over time until it will always be greater than the fixed frame rate measurement interval Ti. From this moment onwards, the determination target picture will **never** be discarded. Hence, the claimed method does not avoid that during a frame rate measurement interval Ti more pictures are designated as encoding targets than the number of pictures n capable of being encoded by the encoder during this interval.

4.5.3 Hence, the objective technical problem to control the computational complexity of the encoder in a case where the input frame rate fluctuates, as formulated by the appellant (see point 4.4 above), is not solved.

4.6 Furthermore, in the case in hand, the appellant did not put forward an alternative objective technical problem that, in its view, was solved by the distinguishing features it had identified.

4.7 In view of this and the case law referred to under point 4.1 above, the board comes to the conclusion that the subject-matter of claim 1 of the third auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

4.8 It is common ground that the differences between the subject-matter of claim 1 of the third auxiliary request and the subject-matter of claim 1 of the fourth and fifth auxiliary requests, respectively, have no bearing on this issue.

4.9 Hence, for the same reasons as set out above for claim 1 of the third auxiliary request, the subject-matter of claim 1 of the fourth and fifth auxiliary requests does not involve an inventive step within the meaning of Article 56 EPC.

5. Sixth auxiliary request, seventh auxiliary request and eighth auxiliary request - added subject-matter (Article 123(2) EPC)

5.1 A 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 (Article 123(2) EPC). This means that an amendment can only be made 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 disclosure of the description, claims and drawings of the application as filed (see Case Law, II.E.1.1).

5.2 Claim 1 of the sixth auxiliary request specifies that d is the number of dropped pictures "*between a time (ti-Ti) and a time ti*". This feature was added by amendment.

5.3 The appellant submitted that this feature was implicitly disclosed by Figure 1 and its description as well as by the last sentence of paragraph [0040] of the description of the application as filed (see point XV.(c) above).

5.4 Figure 1 and its description

5.4.1 The process illustrated in Figure 1 is described in paragraphs [0026] to [0032] of the description. Paragraph [0032] sets out how to deal with a dropped picture.

According to paragraph [0032], a comparison target of the determination target picture is searched for. The comparison target is a picture which is "*a past frame by n ... frames*" (see paragraph [0028]) where "*a dropped picture is not counted*" (see paragraph [0032]). Once the comparison target is found, a difference between its time stamp and the time stamp ti of the determination target picture is determined (see paragraphs [0029] to [0032]). This difference is then compared with the frame rate measurement interval Ti (ibid.).

5.4.2 The board finds that from these passages it cannot be directly and unambiguously derived that all the pictures dropped between the determination target picture and the comparison target were necessarily dropped within the interval between ti-Ti and ti.

In the example of Figure 1 of the application in hand, n is equal to 3 (see paragraph [0027]). The comparison target of picture 6 (i = 6) is picture 2 because picture 5 was dropped and pictures 3 and 4 were not (i-n-d = 6-3-1 = 2). In this scenario, the time stamps of all the pictures that were dropped (namely, picture 5 only) are within the interval between ti-Ti and ti.

However, this scenario is only one of many that may happen when implementing the teachings of the application in hand. Had picture 2 not been one of the first three pictures of the video and had it been dropped due to its time stamp being too close to the time stamps of the previous three pictures sent to the encoder, the comparison target of picture 6 would have been picture 1 (i-n-d = 6-3-2 = 1). In that scenario, the time stamp of the dropped picture 2 would have been earlier than and thus outside the interval between ti-Ti and ti.

5.4.3 The appellant argued that scenarios discussed with reference to Figure 1 in which multiple pictures were dropped were speculative. A possible scenario with reference to Figure 1 was that a single picture was dropped, for example picture 3 instead of picture 5. The comparison target was then picture 2, not picture 1 (see point XV.(c) above).

The board is not convinced by these arguments for the following reasons.

Firstly, d is also not the number of dropped pictures "*between a time (ti-Ti) and a time ti*" in the scenario set out by the appellant because picture 3 is a dropped picture just outside the interval between ti-Ti and ti. This can be observed by comparing in Figure 1 the time

stamp of picture 3 (indicated by a downwards pointing arrow) with the boundaries of the lowermost interval of length Ti = 500.

Secondly, the scenarios put forward by the board and the appellant are not more speculative than the scenario illustrated in Figure 1. All these scenarios are likely to happen when implementing the teachings of the application in hand.

5.5 Paragraph [0040]

5.5.1 The last sentence of paragraph [0040] of the description states that the determination method described earlier in the same paragraph is equivalent to a determination whether the number of pictures input within the interval between ti-Ti and ti exceeds the number of video pictures n capable of being input to a video encoder.

5.5.2 The determination method described earlier in the same paragraph sets out that the difference between the time stamp ti of the determination target picture i and a time stamp t(i-n-d) of a past picture by (n+d) (the comparison target) is determined. The difference in time stamps between the comparison target and the determination target picture is compared with the frame rate measurement interval Ti. If this difference is less than the frame rate measurement interval Ti, the determination target picture is dropped. Since d pictures input between the determination target picture and the comparison target were dropped, only n pictures input during the interval between picture i and the comparison target were sent to the video encoder. This corresponds to the n pictures capable of being encoded by the encoder within the frame rate measurement

interval Ti. Thus, the result mentioned in the last sentence of paragraph [0040] is achieved.

5.5.3 The board notes that all the scenarios discussed under points 5.4.2 and 5.4.3 above also achieve this result and may happen when carrying out the determination method described in paragraph [0040]. However, it was already shown that in two of them d was not the number of dropped pictures "*between a time (ti-Ti) and a time ti*".

Therefore, this feature is not directly and unambiguously derivable from the last sentence of paragraph [0040] of the description.

5.6 In view of the above, the board finds that claim 1 of the sixth auxiliary request does not meet the requirements of Article 123(2) EPC.

5.7 It is common ground that the differences between the subject-matter of claim 1 of the sixth auxiliary request and the subject-matter of claim 1 of the seventh and eighth auxiliary requests had no bearing on this issue.

5.8 Hence, claim 1 of the seventh and eighth auxiliary requests does not meet the requirements of Article 123(2) EPC for the same reasons as set out above for claim 1 of the sixth auxiliary request.

6. Conclusion

The main request and the first and second auxiliary requests are not allowable because claim 1 of each of these requests does not meet the requirements of Article 84 EPC.

The third auxiliary request, the fourth auxiliary request and the fifth auxiliary request are not allowable because the subject-matter of claim 1 of each of these requests does not involve an inventive step within the meaning of Article 56 EPC.

The sixth auxiliary request, the seventh auxiliary request and the eighth auxiliary request are not allowable because claim 1 of each of these requests does not meet the requirements of Article 123(2) EPC.

Since none of the appellant's requests is allowable, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

K. Boelicke T. Karamanli

Decision electronically authenticated