

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

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Date of mailing
(day/month/year)

18 FEB 2020

Applicant's or agent's file reference
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FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/US 19/63698

International filing date (day/month/year)

27 November 2019 (27.11.2019)

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International Patent Classification (IPC) or both national classification and IPC

IPC - H04N 19/126 (2020.01)

CPC - H04N 19/15, H04N 19/126, H04N 19/17, H04N 19/167, H04N 19/198

Applicant

OP SOLUTIONS, LLC

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

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Date of completion of this opinion

04 February 2020 (04.02.2020)

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Box No. I **Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:
- the international application in the language in which it was filed.
- a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b)).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
- a. forming part of the international application as filed:
- in the form of an Annex C/ST.25 text file.
- on paper or in the form of an image file.
- b. furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
- c. furnished subsequent to the international filing date for the purposes of international search only:
- in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
- on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	None	YES
	Claims	1-20	NO
Inventive step (IS)	Claims	None	YES
	Claims	1-20	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1-20 lack novelty under PCT Article 33(2) as being anticipated by US 2015/0016510 A1 to Microsoft Corporation (hereinafter Microsoft).

As per claims 1 and 11, Microsoft teaches an encoder (abstract, para [0027], [0032]), the encoder comprising circuitry configured to: receive a video frame (e.g. an input video signal captured from a camera, and divided into portions to be encoded by a video encoder so as to generate an encoded bitstream. The signal comprises a moving video image divided in time into a plurality of frames (F), each frame representing the image at a different respective moment in time (. . . t-1, t, t+1 . . .). Within each frame, the frame is divided in space into a plurality of portions each representing a plurality of pixels. The portions may for example be referred to as blocks. In certain schemes, the frame is divided and sub-divided into different levels of portion or block. For example each frame may be divided into macroblocks (MB) and each macroblock may be divided into blocks (b), para [0027]); partition the video frame into blocks (para [0027]); determine a first area within the video frame including a first grouping of a first subset of the blocks (e.g. The ROI is a sub-area within (so smaller than) the area of the video image, i.e. within the frame area which is common to each frame. It is used to cover a region of the video image considered to have a higher subjective importance than the remaining region of the video image's frame area outside the ROI, para [0042]; para [0027]); determine a first average measure of information of the first area (e.g. a quantization parameter offset (QPoffset) between the ROI and non-ROI regions set to some initial default or predetermined value, e.g. QPoffset=-12 has been found to work well for most cases (where QP is defined according to H.264); (ii) track two moving averages of the number of bits per pixel inside and outside of the ROI respectively, para [0023]-[0024]; para [0051]; e.g. Averages can be calculated in different ways, e.g. weighted average and/or geometric average. The latter can be generalized to applying a nonlinear function before averaging, and then applying the inverse. For example the geometric average can be calculated as $\exp(\text{mean}(\log(\text{QP.sub.vector})))$, where QP.sub.vector is the QP a function of position in the frame. E.g. in H264 it is possible to set QP for each macroblock (16 by 16 pixels). In principle, it would also be possible to set for smaller blocks, e.g. 4.times.4, or 8.times.8 which is the typical blocksize of typical DCT-style transforms, or even individual pixels, para [0057]); and encode the video frame, the encoding including controlling, using the first average measure of information of the first area, a quantization parameter (e.g. the adaptation module 50 measures the average (per pixel) number of bits incurred by encoding the non-ROI area using granularity QP, and also measures the average (per pixel) number of bits incurred by encoding the ROI using granularity QP+QPoffset. The adaptation module 50 then compares the two measures to determine whether the bitrate incurred inside the ROI is above or below some target set relative to the bitrate incurred in the non-ROI area, and adjusts the quantization difference depending on the result, para [0051]; para [0023]-[0024], [0046], [0049]-[0057]).

As per claims 2 and 12, Microsoft teaches wherein a block size of the blocks is 4 x 4 (para [0057]).

As per claims 3 and 13, Microsoft teaches further configured to receive semantic information, wherein the first grouping is determined based on the received semantic information (para [0042]-[0044]).

As per claims 4 and 14, Microsoft teaches wherein the semantic information includes data characterizing a facial detection (para [0042]-[0044]).

As per claims 5 and 15, Microsoft teaches wherein the first average measure of information is determined by calculating a sum of a plurality of information measures of the plurality of blocks (para [0051], [0057]).

As per claims 6 and 16, Microsoft teaches wherein the first average measure of information is further determined by multiplying the sum by a significance coefficient (para [0051], [0057]).

As per claims 7 and 17, Microsoft teaches wherein the significance coefficient is determined based on a characteristic of the first area (para [0046], [0049]-[0057]).

As per claims 8 and 18, Microsoft teaches wherein the controlling includes determining a first quantization size based on the first measure of information (para [0023]-[0024], [0046], [0049]-[0057]).

-Continuation in supplemental box-

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V, 2: Citations and Explanations

As per claims 9 and 19, Microsoft teaches further comprising: a transform and quantization processor (para [0034], [0039]-[0043]); an inverse quantization and inverse transformation processor (para [0034], [0039]-[0043]); an in loop filter (para [0037]); a decoder picture buffer (para [0034], [0039]-[0046]); a motion estimation and compensation processor (para [0034], [0039]-[0043]); and an intra prediction processor (para [0034], [0039]-[0043]).

As per claims 10 and 20, Microsoft teaches further configured to: determine a second area within the video frame including a second grouping of a second subset of the blocks (para [0046], [0049]-[0057]); and determine a second average measure of information of the second area, wherein the controlling is further based on the second average measure of information of the second area (para [0046], [0049]-[0057]).

Claims 1-20 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.