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(54) **Title**: SEGMENTAL PREDICTION FOR VIDEO CODING

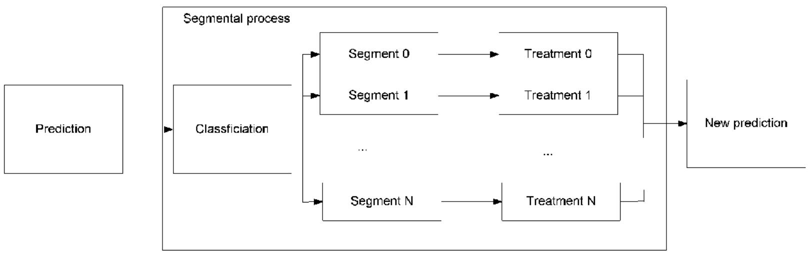

Fig.6

(57) **Abstract**: A segmental prediction coding method is proposed.By segment prediction pixels into different segments with different treatments,prediction coding can be more efficient.

WO 2015/196333 A1

SEGMENTAL PREDICTION FOR VIDEO CODING

TECHNICAL FIELD

[0001] The invention relates generally to video/image processing.

BACKGROUND

[0002] Prediction takes a critical role in video coding. When coding or decoding a block, a prediction block, which is generated by intra-prediction or inter-prediction, is obtained first before producing residues at encoder or reconstructing the reconstruction samples at decoder.

[0003] Besides inter-prediction and intra-prediction, a new prediction mode named intra-block copy (IBC) has been adopted in the screen content coding (SCC) profile for high efficiency video coding (HEVC) standard. IBC was adopted to take advantage of reduplicated content in a picture. As depicted in Fig.1, a reference block in the current picture is copied to the current block as the prediction if IBC is applied. The reference block is located by applying a block-copying vector (BV). The samples in the reference block must have been reconstructed already before the current block is coded or decoded.

[0004] Inter simplified depth coding (InterSDC) is adopted into 3D-HEVC as a special prediction mode for depth coding. When InterSDC is used, a normal inter-prediction is performed for the current block first. Then each pixel in the prediction block is added by a coded offset. Suppose $P_{i,j}$ represents the prediction value at pixel position (i, j) after performing the normal inter-prediction, *Offset* is the offset coded for this block. Then the final prediction value at pixel position is $P_{i,j}$+ *Offset*. With InterSDC mode, no residues are coded. Thus the final prediction value will be output as the reconstructed value.

[0005] Depth lookup table (DLT) is adopted into 3D-HEVC. Since there are often only several values appearing in the depth component, DLT signals those valid values from the encoder to the decoder. When a CU is coded in intra simplified depth coding (SDC) mode or depth map modeling (DMM) mode, DLT is used to map the valid depth value to a DLT index which is much easier to compress. Fig.2 demonstrates an example of DLT approach. DLT is signaled in picture parameter set (PPS). And it is left to be an encoder issue how to get the DLT when encoding.

[0006] Since prediction values come from reconstructed pixels, there are distortions between the prediction values and the original values, even if the original pixels in the current block and the original pixels in the reference block are exactly the same. Because the reconstructed signal loses high-frequency information generally, the quality of prediction is deteriorated more when there are sharp pixel value changes in the reference block. Fig. 3 and Fig. 4 demonstrate two examples where there are two and three segments with sharp edges in a block.

SUMMARY

[0007] In light of the previously described problems, a segmental prediction method is proposed. The prediction block is processed by a segmental process before it is used to get residues at an encoder or get reconstruction at a decoder. The segmental prediction method comprises classifying pixels in the prediction block into different categories, named as 'segment', wherein the pixels in the segment can be adjacent or not, treating the pixels in different segments in different ways, and forming a new prediction block after the treatment. The new prediction block is used to get the residues at the encoder or get the reconstruction at the decoder.

[0008] Other aspects and features of the invention will become apparent to those with ordinary skill in the art upon review of the following descriptions of specific embodiments.

BRIEF DESCRIPTION OF DRAWINGS

[0009] The invention can be more fully understood by reading the subsequent detailed description and examples with references made to the accompanying drawings, wherein:

[0010] Fig. 1 is a diagram illustrating intra block copying;

[0011] Fig. 2 is a diagram illustrating is a diagram illustrating an example of DLT where five valid values appear in depth samples.

[0012] Fig. 3 is a diagram illustrating a block with two segments with sharp sample value changes;

[0013] Fig. 4 is a diagram illustrating a block with three segments with sharp sample value changes;

[0014] Fig. 5 is a diagram illustrating an exemplary segmental prediction architecture at the decoder;

[0015] Fig. 6 is a diagram illustrating an exemplary segmental process architecture;

[0016] Fig. 7 is a diagram illustrating an exemplary treatment for a segment. After the treatment, pixels in the segment can hold different values;

[0017] Fig. 8 is a diagram illustrating an exemplary treatment for a segment. After the treatment, pixels in the segment hold only one value.

DETAILED DESCRIPTION

[0018] The following description is of the best-contemplated mode of carrying out the invention. This description is made for the purpose of illustrating the general principles of the invention and should not be taken in a limiting sense. The scope of the invention is best determined by reference to the appended claims.

[0019] A segmental prediction method is proposed.

[0020] In one embodiment, the prediction block is processed by a segmental process before it is used to get the residues at encoder or get the reconstruction at decoder. In another embodiment, the prediction block is processed by a segmental process, and then the modified prediction block is output as the reconstruction without adding to residues. Fig. 5 demonstrates segmental prediction architecture at the decoder.

[0021] In the segmental process, there are two steps generally as depicted in Fig.6. The first step is called 'classification', in which the pixels in a prediction block are classified into different categories, named as 'segment'. Pixels in a segment can be adjacent or not. The second step is called 'treatment', in which pixels in different segments are treated in different ways. Finally, all the pixels after the treatment form a new prediction block which is output then. The number of segments can be any positive integers such as 1, 2, 3, *etc*.

[0022] In one embodiment, the prediction values can be classified according to their values.

[0023] In another embodiment, the prediction values can be classified according to their positions.

[0024] In still another embodiment, the prediction values can be classified according to their gradients. Gradients can be got by applying operators such as Sobel, Roberts, and Prewitt.

[0025] In still another embodiment, classification is not applied if the number of segments is one.

[0026] In still another embodiment, the prediction block is classified into two segments in the classification step. A pixel is classified according to its relationship with a threshold number T. In one example, a pixel is classified into segment 0 if its value is larger than T, Otherwise it is classified into segment 1. In another example, a pixel is classified into segment 0 if its value is larger than or equal to T, Otherwise it is classified into segment 1.

[0027] In still another embodiment, T is calculated as a function of all the pixel values in the prediction block. In a formula way, $T=f(P)$, where P represents all the pixel values in the prediction block.

[0028] In still another embodiment, T is calculated as the average value of all the pixel values in the prediction block.

[0029] In still another embodiment, T is calculated as the middle value of all the pixel values in the prediction block.

[0030] In still another embodiment, T is calculated as the average value of the minimum and the maximum pixel value in the prediction block. In a formula way, $T=(Vmax+Vmin)/2$, where $Vmax$ and $Vmin$ are the minimum and the maximum pixel value in the prediction block respectively.

[0031] In still another embodiment, the prediction block is classified into M ($M>2$) segments in the classification step. A pixel is classified according to its relationship with $M-1$ threshold numbers $T_1 <= T_2 <= \ldots <= T_{M-1}$. In one example where M is equal to 3, a pixel is classified into segment 0 if its value is smaller than T_1; it is classified into segment 2 if its value is larger than T_2; otherwise it is classified into segment 1. In another example, a pixel is classified into segment 0 if its value is smaller than or equal to T_1; it is classified into segment 2 if its value is larger than T_2; otherwise it is classified into segment 1.

[0032] In still another embodiment, T_k is calculated as a function of all the pixel values in the prediction block, where k if from 1 to M-1. In a formula way, $T_k = f_k(P)$, where P represents all the pixel values in the prediction block.

[0033] In still another embodiment where M is equal to 3, T_k is calculated as

[0034] $T_1 = (T+Vmin)/2$

[0035] and

[0036] $T_2 = (Vmax+T)/2$,

[0037] where T is the average value of all the pixel values in the prediction block. $Vmax$ and $Vmin$ are the minimum and the maximum pixel value in the prediction block respectively.

[0038] In one embodiment as depicted in Fig. 7, an offset Off_U is added to a pixel in a segment, denoted as segment U, in the treatment process to get the new prediction value. In a formula way, $Vnew=Vold+ Off_U$, where $Vold$ is the pixel value before the treatment and $Vnew$ is the pixel value after the treatment respectively.

[0039] In another embodiment as depicted in Fig. 8, all pixels possess the same value V_U in a segment, denoted as segment U, after the treatment process. an offset Off_U is added to an estimated value E_U to obtain V_U. In a formula way, $V_U = E_U + Off_U$.

[0040] In another embodiment, E_U is calculated as a function of all the pixel values in segment U. In a formula way, $E_U = f(P_U)$, where P_U represents all the pixel values in segment U.

[0041] In still another embodiment, E_U is calculated as the average value of all the pixel prediction values in segment U.

[0042] In still another embodiment, E_U is calculated as the middle value of all the pixel prediction values in segment U.

[0043] In still another embodiment, E_U is calculated as the average value of the minimum and the maximum pixel prediction value in segment U. In a formula way, $E_U= (V^U max+V^U min)/2$, where $V^U max$ and $V^U min$ are the minimum and the maximum pixel prediction value in segment U respectively.

[0044] In one embodiment, the offset Off_U for segment U can be signaled explicitly by the encoder to decoder, or it can be derived implicitly by the decoder.

[0045] In one embodiment, the offset Off_U for segment U is calculated by the encoder according to the pixel original values in segment U and pixel prediction values in segment U. For example, the offset Off_U for segment U is calculated by the encoder by subtracting the average value of all the pixel original values in segment U and the average value of all the pixel prediction values in segment U.

[0046] In another embodiment, the offset Off_U for segment U is calculated by the encoder by subtracting the average value of all the pixel original values in segment U and E_U.

[0047] In still another embodiment, $OffIdx_U$ instead of Off_U is coded. $OffIdx_U$ is the DLT index offset.

[0048] In still another embodiment, V_U is calculated as $V_U = g(f(E_U) + OffIdx_U)$, where f represents a function mapping a depth value to a DLT index, and g represents a function mapping a DLT index to a depth value. $f(E_U) + OffIdx_U$ should be clipped to a valid DLT index.

[0049] In another embodiment, the DLT index offset $OffIdx_U$ for segment U is calculated by the encoder by subtracting DLT index of the average value of all the pixel original values in segment U and the DLT index of E_U. In a formula way, $OffIdx_U = f(A_U) - f(E_U)$, where A_U is the average value of all the original pixel values in segment U and f represents a function mapping a depth value to a DLT index.

[0050] In one embodiment, the segmental prediction method can be used or not adaptively. The encoder can send the information of whether to use the segmental prediction method to the decoder explicitly. Or the decoder can derive whether to use the segmental prediction method in the same way as the encoder implicitly.

[0051] In still another embodiment, the segmental prediction method can be applied on coding tree unit (CTU), coding unit (CU), prediction unit (PU) or transform unit (TU).

[0052] In still another embodiment, the encoder can send the information of whether to use the segmental prediction method to the decoder in video parameter set (VPS), sequence parameter set (SPS), picture parameter set (PPS), slice header (SH), CTU, CU, PU, or TU.

[0053] In still another embodiment, the segmental prediction method can only be applied for CU with some particular sizes. For example, it can only be applied to a CU with size larger than 8x8. In another example, it can only be applied to a CU with size smaller than 64x64.

[0054] In still another embodiment, the segmental prediction method can only be applied for CU with some particular PU partition. For example, it can only be applied to a CU with 2Nx2N partition.

[0055] In still another embodiment, the segmental prediction method can only be applied for CU with some particular coding mode. For example, it can only be applied to a CU with IBC mode.

[0056] In still another embodiment, the segmental prediction method can only be applied for CU with InterSDC mode.

[0057] In one embodiment, the number of segments in the segmental prediction method is adaptively. The encoder can send the information of how many segments to the decoder explicitly when the segmental prediction method is used. Or the decoder can derive the number in the same way as the encoder implicitly.

[0058] In still another embodiment, the encoder can send the information of how many segments to the decoder in video parameter set (VPS), sequence parameter set (SPS), picture parameter set (PPS), slice header (SH), CTU, CU, PU, or TU where the segmental prediction method is used.

[0059] In still another embodiment, the encoder can send the information of the offsets for each segment to the decoder in video parameter set (VPS), sequence parameter set (SPS), picture parameter set (PPS), slice header (SH), CTU, CU, PU, or TU where the segmental prediction method is used.

[0060] In still another embodiment, the encoder can send the information of whether to use the segmental prediction method to the decoder in a CU coded with InterSDC mode.

[0061] In still another embodiment, the encoder can send the information of how many segments to the decoder in a CU coded with InterSDC mode.

[0062] In still another embodiment, the encoder can send the information of the offsets or DLT index offsets for each segment to the decoder in a CU coded with InterSDC and in which the segmental prediction method is used.

[0063] In still another embodiment, the segmental prediction method can be applied to the texture component. It can also be applied to depth components in 3D video coding.

[0064] In still another embodiment, the segmental prediction method can be applied to the luma component. It can also be applied to chroma components.

[0065] In still another embodiment, the decision of whether to use segmental prediction method can be made separately for each component, with information signaled separately. Or, the decision of whether to use segmental prediction method can be made together for all components, with a single piece of information signaled.

[0066] In still another embodiment, the number of segments when segmental prediction method is used can be controlled separately for each component separately, with information signaled separately. Or, the number of segments when segmental prediction method is used can be controlled together for all components, with a single piece of information signaled.

[0067] In still another embodiment, the offsets for each segment when segmental prediction method is used can be decided separately for each component separately, with information signaled separately. Or, the offsets for each segment when segmental prediction method is used can be decided together for all components, with a single piece of information signaled.

[0068] The methods described above can be used in a video encoder as well as in a video decoder. Embodiments of disparity vector derivation methods according to the present invention as described above may be implemented in various hardware, software codes, or a combination of both. For example, an embodiment of the present invention can be a circuit integrated into a video compression chip or program codes integrated into video compression software to perform the processing described herein. An embodiment of the present invention may also be program codes to be executed on a Digital Signal Processor (DSP) to perform the processing described herein. The invention may also involve a number of functions to be performed by a computer processor, a digital signal processor, a microprocessor, or field programmable gate array (FPGA). These processors can be configured to perform particular tasks according to the invention, by executing machine-readable software code or firmware code that defines the particular methods embodied by the invention. The software code or firmware codes may be developed in different programming languages and different format or style. The software code may also be compiled for different target platform. However, different code formats, styles and languages of software codes and other means of configuring code to perform the tasks in accordance with the invention will not depart from the spirit and scope of the invention.

[0069] The invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described examples are to be considered in all respects only as illustrative and not restrictive. To the contrary, it is intended to cover various modifications and similar arrangements (as would be apparent to those skilled in the art). Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements.

CLAIMS

1. A method of segmental prediction coding, in which a prediction block is processed by a segmental process before used to get residues at an encoder or get reconstruction at a decoder, comprising,

classifying pixels in the prediction block into different categories, named as ‘segment’, wherein the pixels in a segment is either adjacent or not;

treating the pixels in different segments in different ways; and

forming a new prediction block after treatment for all the pixels, wherein the new prediction block is used to get the residues at the encoder or get the reconstruction at the decoder.

2. The method as claimed in claim 1, wherein prediction values are classified according to values, positions, or gradients.

3. The method as claimed in claim 2, wherein the prediction block is classified into two segments, and a pixel is classified according to its relationship with a threshold number T.

4. The method as claimed in claim 3, wherein T is calculated as a function of all the pixel values in the prediction block, and the function comprises one of the following calculations:

T is calculated as an average value of all the pixel values in the prediction block;

T is calculated as a middle value of all the pixel values in the prediction block; and

T is calculated as an average value of a minimum and a maximum pixel value in the prediction block, $T= (Vmax+Vmin)/2$, where $Vmax$ and $Vmin$ are the minimum and the maximum pixel value in the prediction block respectively.

5. The method as claimed in claim 2, wherein the prediction block is classified into M (M>2) segments, and a pixel is classified according to its relationship with $M - 1$ threshold numbers $T_1 <= T_2 <= \ldots <= T_{M-1}$.

6. The method as claimed in claim 5, wherein T_k is calculated as a function of all the pixel values in the prediction block, where k if from 1 to M-1, $T_k = f_k (P)$, where P represents all the pixel values in the prediction block.

7. The method as claimed in claim 5, wherein M is equal to 3, a pixel is classified into segment 0 if its value is smaller than T_1; it is classified into segment 2 if its value

is larger than T_2; otherwise it is classified into segment 1, T_1= (T+$Vmin$)/2 and T_2= ($Vmax$+T)/2, where T is an average value of all the pixel values in the prediction block, $Vmax$ and $Vmin$ are a minimum and a maximum pixel value in the prediction block respectively.

8. The method as claimed in claim 1, wherein an offset Off_U is added to a pixel in a segment, denoted as segment U, in the treatment process to get the new prediction value, $Vnew$=$Vold$+ Off_U, where $Vold$ is the pixel value before treatment and $Vnew$ is the pixel value after treatment respectively.

9. The method as claimed in claim 1, wherein all pixels possess a same value V_U in a segment, denoted as segment U, after treatment, and an offset Off_U is added to an estimated value E_U to obtain V_U, $V_U = E_U + Off_U$.

10. The method as claimed in claim 9, E_U is calculated as a function of all the pixel values in segment U, $E_U = f(P_U)$, where P_U represents all the pixel values in segment U, and functions include but not limited to:

E_U is calculated as an average value of all the pixel prediction values in segment U;

E_U is calculated as a middle value of all the pixel prediction values in segment U;

E_U is calculated as an average value of a minimum and a maximum pixel prediction value in segment U, E_U= ($V^U max$+$V^U min$)/2, where $V^U max$ and $V^U min$ are a minimum and the maximum pixel prediction value in segment U respectively.

11. The method as claimed in claim 8, wherein the offset Off_U for segment U is signaled explicitly by the encoder to decoder, or the offset Off_U is derived implicitly by the decoder.

12. The method as claimed in claim 11, wherein $OffIdx_U$ instead of Off_U is coded, and $OffIdx_U$ is depth lookup table (DLT) index offset.

13. The method as claimed in claim 9, wherein V_U is calculated as V_U =g($f(E_U)$ + $OffIdx_U$), where f represents a function mapping a depth value to a DLT index, and g represents a function mapping a DLT index to a depth value, $f(E_U)$ + $OffIdx_U$ is clipped to a valid DLT index.

14. The method as claimed in claim 8, wherein the offset Off_U for segment U is calculated by the encoder according to pixel original values in segment U and pixel prediction values in segment U, wherein the offset Off_U for segment U is calculated by the encoder by subtracting an average value of all the pixel original values in segment U and E_U.

15. The method as claimed in claim 12, wherein the DLT index offset $OffIdx_U$ for segment U is calculated by the encoder by subtracting DLT index of the average value of all the pixel original values in segment U and the DLT index of E_U, $OffIdx_U = f(A_U) - f(E_U)$, where A_U is the average value of all the original pixel values in segment U and f represents a function mapping a depth value to a DLT index.

16. The method as claimed in claim 1, wherein the segmental prediction method is used adaptively, the encoder sends information of whether to use the segmental prediction method to the decoder explicitly, or the decoder derives whether to use the segmental prediction method in the same way as the encoder implicitly.

17. The method as claimed in claim 1, wherein the segmental prediction method is applied on coding tree unit (CTU), coding unit (CU), prediction unit (PU) or transform unit (TU), and the encoder sends information of whether to use the segmental prediction method to the decoder in video parameter set (VPS), sequence parameter set (SPS), picture parameter set (PPS), slice header (SH), CTU, CU, PU, or TU.

18. The method as claimed in claim 1, wherein the segmental prediction method only applies for CU with a predetermined set of sizes.

19. The method as claimed in claim 1, wherein the segmental prediction method only applies for CU with a predetermined set of PU partitions.

20. The method as claimed in claim 1, wherein the segmental prediction method only applies for CU with a predetermined set of coding modes.

21. The method as claimed in claim 1, wherein a number of segments in the segmental prediction method is adaptively, and the encoder sends information of how many segments to the decoder explicitly when the segmental prediction method is used, or the decoder derives the number in the same way as the encoder implicitly.

22. The method as claimed in claim 1, wherein the encoder sends information of how many segments to the decoder in video parameter set (VPS), sequence parameter set (SPS), picture parameter set (PPS), slice header (SH), CTU, CU, PU, or TU where the segmental prediction method is used.

23. The method as claimed in claim 1, wherein the encoder sends information of offsets or DLT index offsets for each segment to the decoder in video parameter set (VPS), sequence parameter set (SPS), picture parameter set (PPS), slice header (SH), CTU, CU, PU, or TU where the segmental prediction method is used.

24. The method as claimed in claim 20, wherein the segmental prediction

method is only applied for CU with InterSDC mode.

25. The method as claimed in claim 1, wherein the segmental prediction method is applied to luma component, chroma components, or both luma and chroma components.

26. The method as claimed in claim 1, wherein the segmental prediction method is applied to a texture component or depth components in 3D video coding.

27. The method as claimed in claim 1, wherein a decision of whether to use segmental prediction method is made separately for each component, with information signaled separately, or the decision of whether to use segmental prediction method is made together for all components, with a single piece of information signaled.

28. The method as claimed in claim 1, wherein a number of segments when segmental prediction method is used is controlled separately for each component separately, with information signaled separately, or the number of segments when segmental prediction method is used is controlled together for all components, with a single piece of information signaled.

29. The method as claimed in claim 1, wherein the offsets for each segment when segmental prediction method is used is decided separately for each component separately, with information signaled separately, or the offsets for each segment when segmental prediction method is used is decided together for all components, with a single piece of information signaled.

30. The method as claimed in claim 16, wherein the encoder sends information of whether to use the segmental prediction method to the decoder in a CU coded with InterSDC mode, for a CU coded with InterSDC and in which the segmental prediction method is used, the encoder sends information of how many segments to the decoder and information of the offsets or DLT index offsets for each segment.

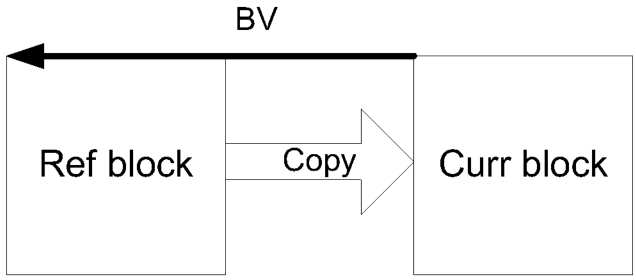

Fig.1

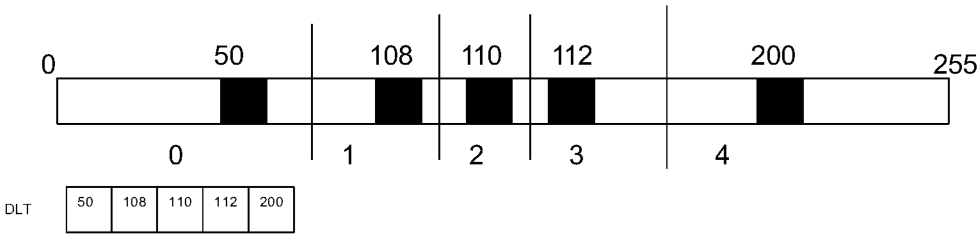

Fig. 2

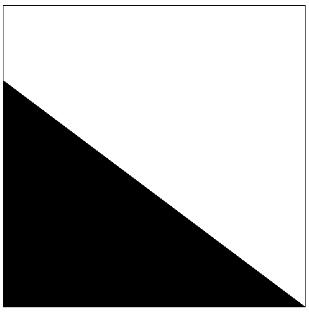

Fig. 3

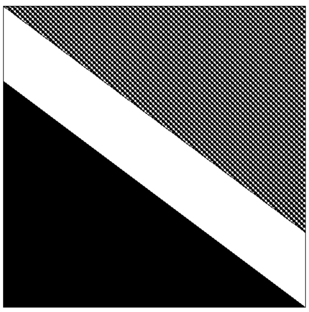

Fig.4

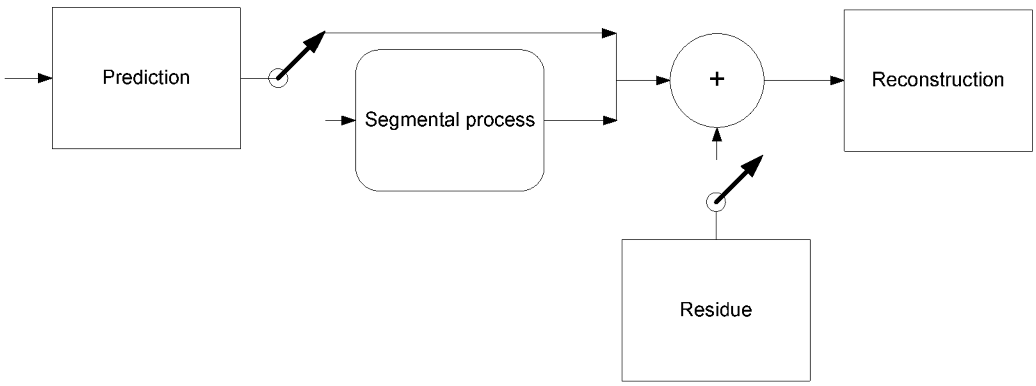
Prediction
Segmental process
+
Reconstruction
Residue

Fig.5

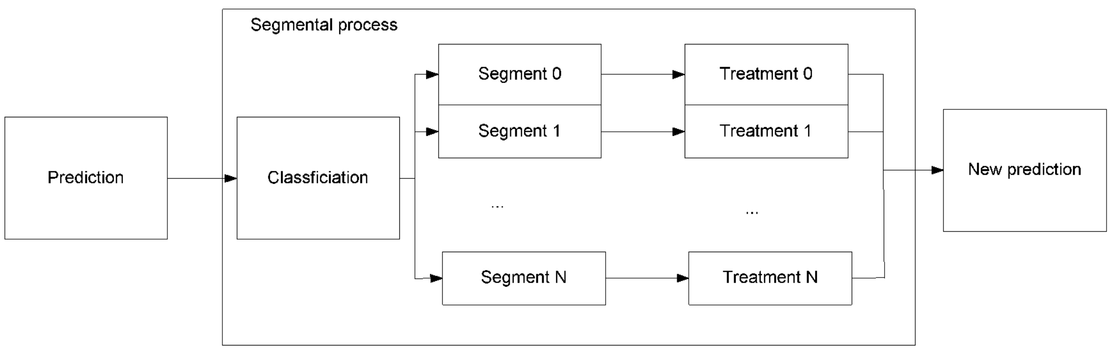
Segmental process
Prediction
Classficiation
Segment 0
Segment 1
...
Segment N
Treatment 0
Treatment 1
...
Treatment N
New prediction

Fig.6

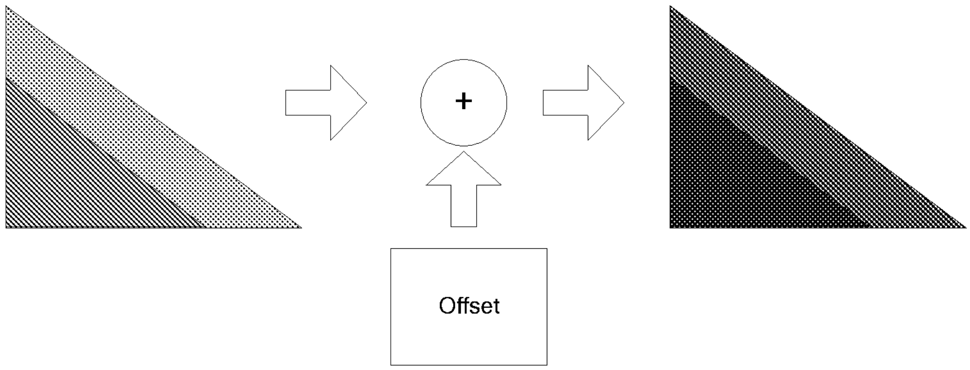

Fig.7

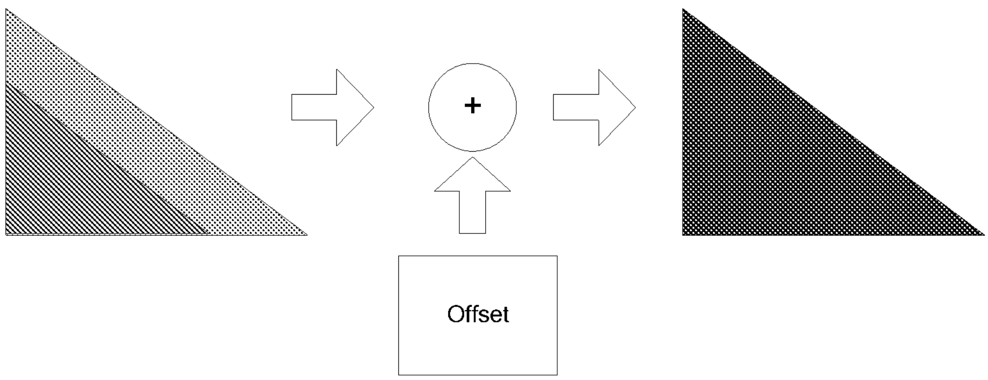

Fig.8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2014/080515

A. CLASSIFICATION OF SUBJECT MATTER

H04N 19/50 (2014.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNPAT, CNKI, WPI, EPODOC:segment+, predict+, residue?, block?, pixel?, class+, different, categor+, cod+, decod+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 103004206 A (NTT DOCOMO INC.) 27 March 2013 (2013-03-27) description, paragraphs [0103], [0109], [0346]-[0359], and figures 1, 4-10, 20, 24-39	1-30
A	CN 103108181 A (SAMSUNG ELECTRONICS CO., LTD.) 15 May 2013 (2013-05-15) the whole document	1-30
A	CN 103650498 A (PANASONIC CORP.) 19 March 2014 (2014-03-19) the whole document	1-30
A	US 6798834 B1 (MURAKAMI, TOKUMICHI ET AL.) 28 September 2004 (2004-09-28) the whole document	1-30

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 March 2015	**25 March 2015**

Name and mailing address of the ISA/CN	Authorized officer
STATE INTELLECTUAL PROPERTY OFFICE OF THE P.R.CHINA(ISA/CN) **6,Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088, China**	**YU,Lina**
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2014/080515

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	103004206	A	27 March 2013	CA	2805735	A1	26 January 2012
				AU	2011280629	A1	21 February 2013
				US	2013136184	A1	30 May 2013
				SG	187094	A1	28 March 2013
				EP	2597874	A1	29 May 2013
				KR	20130041146	A	24 April 2013
				WO	2012011432	A1	26 January 2012
				MX	2013000666	A	26 February 2013
				TW	201215161	A	01 April 2012
				JP	5661114	B2	28 January 2015
				VN	33854	A	27 May 2013
				MX	321386	B	27 June 2014
CN	103108181	A	15 May 2013	US	8244048	B2	14 August 2012
				WO	2008117923	A1	02 October 2008
				US	8625916	B2	07 January 2014
				EP	2613536	A1	10 July 2013
				EP	2611159	A1	03 July 2013
				KR	101403338	B1	09 June 2014
				EP	2127380	A1	02 December 2009
				US	2013148909	A1	13 June 2013
				CN	101641955	A	03 February 2010
				US	2012269449	A1	25 October 2012
				CN	101641955	B	13 March 2013
				KR	20080086771	A	26 September 2008
				US	2008232705	A1	25 September 2008
CN	103650498	A	19 March 2014	MX	2013014753	A	02 April 2014
				US	2013322520	A1	05 December 2013
				TW	201412122	A	16 March 2014
				WO	2013183232	A1	12 December 2013
				AU	2013273044	A1	23 January 2014
				CA	2840064	A1	12 December 2013
				SG	195844	A1	29 January 2014
US	6798834	B1	28 September 2004	US	8295350	B2	23 October 2012
				US	2006140279	A1	29 June 2006
				US	2010208813	A1	19 August 2010
				US	2007014354	A1	18 January 2007
				US	2004240554	A1	02 December 2004
				US	2010208812	A1	19 August 2010
				US	2010208811	A1	19 August 2010