

CLAIMS

1. A method of video processing, comprising:
performing a conversion between a picture of a video and a bitstream representation of the video, wherein the picture comprises one or more sub-pictures, and wherein a number of the one or more sub-pictures is indicated by a syntax element in the bitstream representation.
2. The method of claim 1, wherein the number of the multiple sub-pictures is represented as N , and wherein the syntax element includes a value of $(N-d)$, N and d being integers.
3. The method of claim 2, wherein d is 0, 1, or 2.
4. The method of claim 2 or 3, wherein the value of $(N-d)$ is coded using a unary coding scheme or a truncated unary coding scheme.
5. The method of claim 2 or 3, wherein the value of $(N-d)$ is coded to have a fixed length using a fixed length coding scheme.
6. The method of claim 5, wherein the fixed length is 8 bits.
7. The method of claim 5, wherein the fixed length is represented as $x-dx$, x and dx being positive integers, wherein x is equal to or smaller than a maximum value determined based on a conformance rule, and wherein dx is 0, 1, or 2.
8. The method of claim 7, wherein $x-dx$ is signaled.
9. The method of claim 5, wherein the fixed length is determined based on a number of basic unit blocks in the picture.
10. The method of claim 9, wherein the fixed length is represented as x , wherein the number of basic unit blocks is represented as M , and wherein $x = \text{Ceil}(\log_2(M+d_0)) + d_1$, d_0 and d_1 being integers.

11. The method of any of claims 2 to 10, wherein a maximum value of (N-d) is predetermined.
12. The method of any of claims 2 to 11, wherein a maximum value of (N-d) is determined based on a number of basic unit blocks in the picture.
13. The method of claim 12, wherein the number of basic unit blocks in the picture is represented as M, M being an integer, and wherein the maximum value of N-d is M-d.
14. The method of claim 13, wherein a basic unit block comprises a slice.
15. The method of claim 13, wherein a basic unit block comprises a coding tree unit.
16. The method of claim 10, wherein at least one of d0 or d1 is -2, -1, 0, 1, or 2.
17. A method of video processing, comprising:
 - performing a conversion between a picture of a video that comprises one or more sub-pictures and a bitstream representation of the video,
 - wherein the bitstream representation conforms to a format rule; and
 - wherein the format rule specifies that information about a sub-picture is included in the bitstream representation based on at least one of: (1) one or more corner positions of the sub-picture, or (2) a dimension of the sub-picture.
18. The method of claim 17, wherein the format rule further specifies that the information about the sub-picture is positioned after information about a size of a coding tree block in the bitstream representation.
19. The method of claim 17 or 18, wherein the one or more corner positions of the sub-picture is signaled in the bitstream representation using a granularity of a block in the sub-picture.

20. The method of claim 19, wherein the block comprises a basic unit block or a coding tree block.
21. The method of any of claims 17 to 20, wherein an index of a block is used to indicate a corner position of the sub-picture.
22. The method of any of claims 17 to 21, wherein the index comprises a column index or a row index.
23. The method of claim 21 or 22, wherein the index of the block is represented as I , and wherein a value of $(I - d)$ is signaled in the bitstream representation, d being 0, 1, or 2.
24. The method of claim 23, wherein d is determined based on an index of previously coded sub-picture and another integer $d1$, $d1$ being equal to -1, 0, or 1.
25. The method of claim 23, wherein a sign of $(I-d)$ is signaled in the bitstream representation.
26. The method of any of claims 17 to 25, wherein whether a position of the sub-picture is signaled in the bitstream representation is based on an index of the sub-picture.
27. The method of claim 26, wherein the position of the sub-picture is omitted in the bitstream representation in case the sub-picture is a first sub-picture in the picture.
28. The method of claim 27, wherein a top-left position of the sub-picture is determined to be $(0, 0)$.
29. The method of claim 26, wherein the position of the sub-picture is omitted in the bitstream representation in case the sub-picture is a last sub-picture in the picture.
30. The method of claim 29, wherein a top-left position of the sub-picture is determined based on information about a sub-picture previously converted.

31. The method of any of claims 17 to 30, wherein the information about the sub-picture comprises a top-left position and a dimension of the sub-picture, and wherein the information is coded using a truncated unary coding scheme, a truncated binary coding scheme, a unary coding scheme, a fixed length coding scheme, or a K-th EG coding scheme.
32. The method of any of claims 17 to 31, wherein a dimension of the sub-picture is signaled in the bitstream representation using a granularity of a block in the sub-picture.
33. The method of claim 32, wherein the dimension comprises a width or a height of the sub-picture.
34. The method of claim 31 or 32, wherein the dimension is represented as a number of columns or a number of rows of blocks in the sub-picture.
35. The method of claim 34, wherein the number of columns or the number of rows of blocks is represented as I , and wherein a value of $(I - d)$ is signaled in the bitstream representation, d being 0, 1, or 2.
36. The method of claim 35, wherein d is determined based on a dimension of a block of a previously coded sub-picture and another integer d_1 , d_1 being equal to -1, 0, or 1.
37. The method of claim 35, wherein a sign of $(I - d)$ is signaled in the bitstream representation.
38. The method of any of claims 23 to 25 or 35 to 37, wherein the value of $(I - d)$ is coded to have a fixed length using a fixed length coding scheme.
39. The method of claim 38, wherein the fixed length is 8 bits.

40. The method of claim 38, wherein the fixed length is represented as $x-dx$, x and dx being positive integers, wherein x is equal to or smaller than a maximum value determined based on a conformance rule, and wherein dx is 0, 1, or 2.
41. The method of claim 38, wherein the fixed length is determined based on a number of basic unit blocks in the picture.
42. The method of claim 41, wherein the fixed length is represented as x , wherein the number of basic unit blocks is represented as M , and wherein $x = \text{Ceil}(\log_2(M+d_0)) + d_1$, d_0 and d_1 being integers.
43. The method of claim 42, wherein at least one of d_0 or d_1 is -2, -1, 0, 1, or 2.
44. The method of any of claims 23 to 25 or 35 to 33, wherein $(I - d)$ is signaled for all sub-pictures of the picture.
45. The method of any of claims 23 to 25 or 35 to 43, wherein $(I - d)$ is signaled for a subset of sub-pictures of the picture.
46. The method of claim 45, wherein the value of $(I-d)$ is omitted in the bitstream representation in case a number of sub-pictures is equal to 1.
47. The method of claim 45, wherein the value of $(I-d)$ is omitted in the bitstream representation in case the sub-picture is a first sub-picture of the picture.
48. The method of claim 47, wherein the value of $(I-d)$ is determined to be 0.
49. The method of claim 45, wherein the value of $(I-d)$ is omitted in the bitstream representation in case the sub-picture is a last sub-picture of the picture.

50. The method of claim 49, wherein the value of (I-d) is determined based on information about a sub-picture previously converted.
51. The method of any of claims 17 to 50, wherein a single syntax element is conditionally included in the bitstream representation to indicate whether all sub-pictures of the picture are processed as a picture.
52. The method of any of claims 17 to 50, wherein a single syntax element is conditionally included in the bitstream representation to indicate whether a loop filter is applicable across sub-pictures of the picture for all sub-pictures.
53. The method of claim 51 or 52, wherein the single syntax element is omitted in the bitstream representation in case a number of sub-pictures of the picture is equal to 1.
54. A method of video processing, comprising:
determining that a reference picture resampling tool is enabled for a conversion between a picture of a video and a bitstream representation of the video due to the picture being divided into one or more sub-pictures; and
performing the conversion based on the determining.
55. The method of claim 54, wherein a scaling ratio used in the reference picture resampling coding tool is determined based on a set of ratios.
56. The method of claim 55, wherein the set of ratios comprises at least one of:
{1:1, 1:2}, {1:1, 2:1}, {1:1, 1:2, 1:4}, {1:1, 1:2, 4:1}, {1:1, 2:1, 1:4}, {1:1, 2:1, 4:1}, {1:1, 1:2, 1:4, 1:8}, {1:1, 1:2, 1:4, 8:1}, {1:1, 1:2, 4:1, 1:8}, {1:1, 1:2, 4:1, 8:1}, {1:1, 2:1, 1:4, 1:8}, {1:1, 2:1, 1:4, 8:1}, {1:1, 2:1, 4:1, 1:8}, or {1:1, 2:1, 4:1, 8:1}.
57. The method of any of claims 54 to 56, wherein a size of a coding tree block of the picture is different than a size of a coding tree block of a second picture in case a resolution of the picture is different than a resolution of the second picture.

58. The method of any of claims 54 to 57, wherein a sub-picture of the picture has a dimension of $SAW \times SAH$ and a sub-picture of a second picture of the video has a dimension of $SBW \times SBH$, wherein scaling ratios between the picture and the second picture are R_w and R_h along a horizontal direction and a vertical direction, wherein SAW/SBW or SBW/SAW is equal to R_w , and wherein SAH/SBH or SBH/SAH is equal to R_h .

59. A method of video processing, comprising:

performing a conversion between video comprising a video picture comprising one or more sub-pictures comprising one or more slices and a bitstream representation of the video,

wherein the bitstream representation conforms to a format rule,

wherein the format rule specifies that, for a sub-picture and a slice, in case that an index identifying the sub-picture is included in a header of the slice, an address field for the slice indicates an address of the slice in the sub-picture.

60. The method of any of claims 1 to 59, wherein the conversion generates the video from the bitstream representation.

61. The method of any of claims 1 to 59, wherein the conversion generates the bitstream representation from the video.

62. A video processing apparatus comprising a processor configured to implement a method recited in any one or more of claims 1 to 61.

63. A computer-readable medium having code stored thereon, the code, when executed, causing a processor to implement a method recited in any one or more of claims 1 to 61.

64. A computer readable medium that stores a coded representation generated according to any of claims 1 to 61.