

CLAIMS

What is claimed is:

1. A method implemented in a decoder, the method comprising:
 - receiving a bitstream comprising a plurality of sub-pictures partitioned from a picture such that a union of the sub-pictures covers a total area of the picture without overlap; wherein the bitstream further comprises a sequence parameter set (SPS), the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the plurality of sub-pictures;
 - parsing the SPS to obtain the sub-picture ID, the sub-picture size and the sub-picture location for each of the plurality of sub-pictures;
 - decoding the bitstream to obtain the one or more sub-pictures.
2. The method of claim 1, wherein the union of the sub-pictures further covers the total area of the picture without gap.
3. The method of any one of claims 1-2, wherein each sub-picture includes a sub-picture width that is an integer multiple of a coding tree unit (CTU) size when the each sub-picture includes a right border that does not coincide with a right border of the picture.
4. The method of any one of claims 1-3, wherein each sub-picture includes a sub-picture height that is an integer multiple of the CTU size when the each sub-picture includes a bottom border that does not coincide with a bottom border of the picture.
5. The method of any one of claims 1-4, wherein the SPS further comprises an indication that one or more of the sub-pictures are motion constrained sub-pictures.

6. A method implemented in an encoder, the method comprising:
 - partitioning a picture into a plurality of sub-pictures such that a union of the sub-pictures covers a total area of the picture without overlap;
 - encoding a sequence parameter set (SPS) into a bitstream, wherein the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the plurality of sub-pictures;
 - encoding one or more of the sub-pictures into the bitstream.
7. The method of claim 6, the method further comprising:
 - storing, in a memory of the encoder, the bitstream for communication toward a decoder.
8. The method of any one of claims 6-7, wherein the union of the sub-pictures further covers the total area of the picture without gap.
9. The method of any one of claims 6-8, wherein each sub-picture includes a sub-picture width that is an integer multiple of a coding tree unit (CTU) size when the each sub-picture includes a right border that does not coincide with a right border of the picture.
10. The method of any one of claims 6-9, wherein each sub-picture includes a sub-picture height that is an integer multiple of the CTU size when the each sub-picture includes a bottom border that does not coincide with a bottom border of the picture.
11. The method of any one of claims 6-10, wherein the SPS further comprises an indication that one or more of the sub-pictures are motion constrained sub-pictures.
12. A video coding device comprising:
 - a processor, a memory, a receiver coupled to the processor, and a transmitter coupled to the processor, the processor, memory, receiver, and transmitter configured to perform the method of any one of claims 1-11.

13. A non-transitory computer readable medium comprising a computer program product for use by a video coding device, the computer program product comprising computer executable instructions stored on the non-transitory computer readable medium such that when executed by a processor cause the video coding device to perform the method of any one of claims 1-11.

14. A decoder comprising:

a receiving unit, configured to receive a bitstream comprising a plurality of sub-pictures partitioned from a picture such that a union of the sub-pictures covers a total area of the picture without overlap; wherein the bitstream further comprises a sequence parameter set (SPS), the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the plurality of sub-pictures;

a parsing unit, configured to parse the SPS to obtain the sub-picture ID, the sub-picture size and the sub-picture location for each of the plurality of sub-pictures;

a decoding unit, configured to decode the bitstream to obtain the one or more sub-pictures.

15. The decoder of claim 14, wherein the decoder is further configured to perform the method of any one of claims 2-5.

16. An encoder comprising:

a partitioning unit, configured to partition a picture into a plurality of sub-pictures such that a union of the sub-pictures covers a total area of the picture without overlap;

an encoding unit, configured to encode a sequence parameter set (SPS) into a bitstream, wherein the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the plurality of sub-pictures;

the encoding unit, configured to encode one or more of the sub-pictures into a bitstream.

17. The encoder of claim 16, the encoder further comprising:

a storing unit, configured to store the bitstream for communication toward a decoder.

18. The encoder of claim 16 or 17, wherein the encoder is further configured to perform the method of any one of claims 7-11.

19. A non-transitory storage medium which includes an encoded bitstream, the bitstream comprising one or more sub-pictures partitioned from a picture such that a union of the sub-pictures covers a total area of the picture without overlap; wherein the bitstream further comprises a sequence parameter set (SPS), the SPS comprises a sub-picture identifier (ID), a sub-picture size and a sub-picture location for each of the plurality of sub-pictures.
20. A device for coding, comprising:
receiving unit, configured to receive a bitstream to decode;
transmission unit coupled to the receiving unit, the transmission unit, configured to transmit a decoded image to a display unit;
storage unit coupled to at least one of the receiving unit or the transmission unit, the storage unit, configured to store instructions; and
processing unit coupled to the storage unit, the processing unit, configured to execute the instructions stored in the storage unit to perform the method in any one of claims 1 to 11.
21. An decoder comprising processing circuitry for carrying out the method according to any one of claims 1 to 5.
22. An encoder comprising processing circuitry for carrying out the method according to any one of claims 6 to 11.
23. A computer program product comprising program code for performing the method according to any one of claims 1 to 11 when executed on a computer or a processor.
24. A non-transitory computer-readable medium carrying a program code which, when executed by a computer device, causes the computer device to perform the method of any one of claims 1 to 11.