

CLAIMS

What is claimed is:

1. A method implemented in a decoder, the method comprising:
receiving, ~~by a receiver of the decoder,~~ 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;
~~parsing/decoding, by a processor of the decoder,~~ the bitstream to obtain the one or more sub-pictures;
~~generating, by the processor, the one or more sub-pictures to create a video sequence.~~
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 of claims 1-4, wherein the bitstream further comprises a sequence parameter set (SPS) comprising a sub-picture size for the sub-pictures and a sub-picture location for each of the sub-pictures.~~
6. ~~The method of any of claims 1-5, wherein the SPS further comprises sub-picture identifiers (IDs) for each of the sub-pictures.~~

~~75.~~ The method of any one of claims 1-~~64~~, wherein the SPS further comprises an indication that one or more of the sub-pictures are motion constrained sub-pictures.

~~86.~~ A method implemented in an encoder, the method comprising:
partitioning, ~~by a processor of the encoder,~~ 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, ~~by the processor,~~ one or more of the sub-pictures into a the bitstream.

~~97.~~ The method of claim ~~86~~, the method further comprising:
storing, in a memory of the encoder, the bitstream for communication toward a decoder.

~~108.~~ The method of any one of claims ~~86-97~~, wherein the union of the sub-pictures further covers the total area of the picture without gap.

~~119.~~ The method of any one of claims ~~86-98~~, 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.

~~1210.~~ The method of any one of claims ~~86-119~~, 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.

~~13. — The method of any of claims 8-12, further comprising encoding, by the processor, a sequence parameter set (SPS) into the bitstream, the SPS comprising a sub-picture size for the sub-pictures and a sub-picture location for each of the sub-pictures.~~

~~14. — The method of any of claims 8-13, wherein the SPS further comprises sub-picture identifiers (IDs) for each of the sub-pictures.~~

~~1511.~~ The method of any one of claims ~~86-1410~~, wherein the SPS further comprises an indication that one or more of the sub-pictures are motion constrained sub-pictures.

~~16~~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-~~15~~11.

~~17~~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-~~15~~11.

~~18~~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 ~~parsing~~decoding unit, configured to ~~parse~~decode the bitstream to obtain the one or more sub-pictures;

~~— a generating unit, configured to generate the one or more sub-pictures to create a video sequence.~~

~~19~~15. The decoder of claim ~~18~~14, wherein the decoder is further configured to perform the method of any one of claims ~~12-75~~.

~~20~~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.

~~21~~17. The encoder of claim ~~20~~16, the encoder further comprising:

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

2218. The encoder of ~~any of claims 20-21~~claim 16 or 17, wherein the encoder is further configured to perform the method of any one of claims ~~87-1511~~.

2319. 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.

2420. 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 ~~1511~~.

2521. An decoder comprising processing circuitry for carrying out the method according to any one of claims 1 to ~~75~~.

2622. An encoder comprising processing circuitry for carrying out the method according to any one of claims ~~8-6~~ to ~~1511~~.

2723. A computer program product comprising program code for performing the method according to any one of claims 1 to ~~15-11~~ when executed on a computer or a processor.

2824. 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 ~~1511~~.