

WHAT IS CLAIMED IS:

1. ~~A decoder, the decoder comprising circuitry configured to:
receive a bitstream;
partition a current block via an exponential partitioning mode into a first region and a
second region;
determine a motion vector associated with a region of the first region or the second
region, wherein determining includes constructing a candidate list; and
decode the current block using the determined motion vector.~~
2. ~~The decoder of claim 1, wherein constructing the candidate list includes evaluating a
below left candidate, a left candidate, an above left candidate, an above candidate, and
an above right candidate.~~
3. ~~The decoder of claim 2, wherein:
the determined motion vector is for the first region;
the exponential partitioning mode includes a curved line segment between a first luma
location and a second luma location;
the below left candidate is located at a third luma location immediately to the left and
immediately below the second luma location;
the left candidate is located at a fourth luma location immediately to the left of the second
luma location;
the above left candidate is located at a fifth luma location immediately above and
immediately to the left of an upper left most luma location of the first region;
the above candidate is located at a sixth luma location immediately above the first luma
location; and
the above right candidate is located at a seventh luma location immediately above a right-
most luma location of the second region.~~
4. ~~The decoder of claim 2, wherein:
the determined motion vector is for the second region;
the exponential partitioning mode includes a curved line segment between a first luma
location and a second luma location;
the below left candidate is located at a third luma location immediately to the left and
immediately below a lower left most luma location of the second region;~~

~~the left candidate is located at a fourth luma location immediately to the left of the lower-left luma location of the second region;~~

~~the above left candidate is located at a fifth luma location immediately above and immediately to the left of the first location;~~

5 ~~the above candidate is located at a sixth luma location immediately above an upper-right most luma location of the second region; and~~

~~the above right candidate is located at a seventh luma location immediately above and to the right of the upper right most luma location of the second region.~~

10 5. ~~— The decoder of 2, wherein the determined motion vector is for the second region, the decoder further configured to mark a candidate as unavailable in response to determining that the candidate is co-located with the first region.~~

15 6. ~~— The decoder of claim 2, wherein the determined motion vector is for the second region and wherein the decoder is further configured to automatically mark the upper left candidate as unavailable in response to determining that the exponential partitioning mode is enabled.~~

7. ~~— The decoder of claim 2, wherein the determined motion vector is for the first region, the decoder further configured to automatically mark the upper right candidate as unavailable in response to determining that the exponential partitioning mode is enabled.~~

20 8. ~~— The decoder of claim 2, wherein the determined motion vector is for the first region, the decoder further configured to automatically mark the lower left candidate as unavailable in response to determining that the exponential partitioning mode is enabled.~~

9. ~~— The decoder of claim 1, wherein the exponential partitioning mode further comprises a geometric partitioning mode.~~

25 10. ~~— The decoder of claim 1, further configured to determine that a merge mode is enabled for the first region.~~

11. ~~— The decoder of claim 1, further configured to reconstruct pixel data of the current block, the first region and the second region being non-rectangular.~~

12. ~~— The decoder of claim 1, wherein the exponential partitioning mode is signaled in the bitstream.~~

13. — The decoder of claim 1, wherein partitioning the current block via the exponential partitioning mode into the first region and the second region includes partitioning the current block with a curved line characterized by a predefined template.
14. — The decoder of claim 13, wherein the curved line partitioning the current block into the first region and the second region is characterized by a predefined coefficient value.
15. — The decoder of claim 1, wherein the exponential partitioning mode is available for block sizes greater or equal to 8x8 luma samples.
16. — The decoder of claim 1, further comprising:
 - an entropy decoder processor configured to receive the bitstream and decode the bitstream into quantized coefficients;
 - an inverse quantization and inverse transformation processor configured to process the quantized coefficients including performing an inverse discrete cosine transform;
 - a deblocking filter;
 - a frame buffer; and
 - an intra prediction processor.
17. — The decoder of claim 1, wherein the bitstream includes a parameter indicating whether the exponential partitioning mode is enabled for the current block.
18. — The decoder of claim 1, wherein the current block forms part of a quadtree plus binary decision tree.
19. — The decoder of claim 18, wherein the current block is a non-leaf node of the quadtree plus binary decision tree.
20. — The decoder of claim 1, wherein the current block is a coding tree unit or a coding unit.
21. — The decoder of claim 1, wherein the first region is a coding unit or a prediction unit.
22. — A method, the method comprising:
 - receiving, by a decoder, a bitstream
 - partitioning, by the decoder, a current block via an exponential partitioning mode into a first region and a second region;
 - determining, by the decoder, a motion vector associated with a region of the first region or the second region, the determining including constructing a candidate list; and
 - decoding, by the decoder, the current block using the determined motion vector.

23. — ~~The method of claim 22, wherein constructing the candidate list includes evaluating a below left candidate, a left candidate, an above left candidate, an above candidate, and an above right candidate.~~

24. — ~~The method of claim 23, wherein:~~

~~the determined motion vector is for the first region;~~

~~the exponential partitioning mode includes a curved line segment between a first luma location and a second luma location;~~

~~the below left candidate is located at a third luma location immediately to the left and immediately below the second luma location;~~

~~the left candidate is located at a fourth luma location immediately to the left of the second luma location;~~

~~the above left candidate is located at a fifth luma location immediately above and immediately to the left of an upper left most luma location of the first region;~~

~~the above candidate is located at a sixth luma location immediately above the first luma location; and~~

~~the above right candidate is located at a seventh luma location immediately above a right-most luma location of the second region.~~

25. — ~~The method of claim 23, wherein:~~

~~the determined motion vector is for the second region, wherein the exponential partitioning mode includes a curved line segment between a first luma location and a second luma location;~~

~~the below left candidate is located at a third luma location immediately to the left and immediately below a lower left most luma location of the second region;~~

~~the left candidate is located at a fourth luma location immediately to the left of the lower-left luma location of the second region;~~

~~the above left candidate is located at a fifth luma location immediately above and immediately to the left of the first location;~~

~~the above candidate is located at a sixth luma location immediately above an upper-right most luma location of the second region; and~~

~~the above right candidate is located at a seventh luma location immediately above and to the right of the upper-right most luma location of the second region.~~

26. — The method of 23, wherein the determined motion vector is for the second region, and further comprising marking a candidate as unavailable in response to determining that the candidate is co-located with the first region.
27. — The method of claim 23, wherein the determined motion vector is for the second region and the method further comprises:
 5 automatically marking the upper left candidate as unavailable in response to determining that the exponential partitioning mode is enabled.
28. — The method of claim 23, wherein the determined motion vector is for the first region and the method further comprises:
 10 automatically marking the upper right candidate as unavailable in response to determining that the exponential partitioning mode is enabled.
29. — The method of claim 23, wherein the determined motion vector is for the first region and the method further comprises:
 15 automatically marking the lower left candidate as unavailable in response to determining that the exponential partitioning mode is enabled.
30. — The method of claim 22, wherein the exponential partitioning mode further comprises a geometric partitioning mode.
31. — The method of claim 22, further comprising determining that a merge mode or advanced motion vector prediction mode is enabled for the first region.
- 20 32. — The method of claim 22, further comprising reconstructing pixel data of the current block, the first region and the second region being non-rectangular.
33. — The method of claim 22, wherein the exponential partitioning mode is signaled in the bitstream.
- 25 34. — The method of claim 22, wherein partitioning the current block via the exponential partitioning mode into the first region and the second region includes partitioning the current block with a curved line characterized by a predefined template.
35. — The method of claim 33, wherein the curved line partitioning the current block into the first region and the second region is characterized by a predefined coefficient value.
36. — The method of claim 22, wherein the exponential partitioning mode is available for block
 30 sizes greater or equal to 8x8 luma samples.
37. — The method of claim 22, wherein the decoder further comprises:

an entropy decoder processor configured to receive the bitstream and decode the
 bitstream into quantized coefficients;
 an inverse quantization and inverse transformation processor configured to process the
 quantized coefficients including performing an inverse discrete cosine transform;
 5 a deblocking filter;
 a frame buffer; and
 an intra prediction processor.

38. — The method of claim 22, wherein the bitstream includes a parameter indicating whether
 the exponential partitioning mode is enabled for the current block.

10 39. — The method of claim 22, wherein the current block forms part of a quadtree plus binary
 decision tree.

40. — The method of claim 38, wherein the current block is a non-leaf node of the quadtree plus
 binary decision tree.

41. — The method of claim 22, wherein the current block is a coding tree unit or a coding unit.

15 42. — The method of claim 22, wherein the first region is a coding unit or a prediction unit.

1. A decoder configured to:

receive a bit stream including a coded picture, the coded picture including a block of
coded pixels and signaling information including a first partition index useful for determining
 20 the start point of a non-straight non-rectangular partition and a second partition index useful
for determining the end point of the non-straight non-rectangular partition;

determine, using the first partition index, a start point of a non-straight non-rectangular
partition in the block, the start point being located on a first side of the block a first offset
distance from a first corner of the block;

25 determine, using the second partition index, an endpoint of the non-straight non-
rectangular partition in the block, the end point being located on a second side of the block, a
second offset distance from a second corner of the block;

generate first predictive pixel values in a first region on a first side of the non- straight,
non-rectangular partition;

30 generate second predictive pixel values in a second region on a second side of the non-
straight, non-rectangular partition; and

decode the block using the predictive pixel values.

2. The decoder of claim 1, wherein a first motion vector chosen from a first set of motion vector candidates is used to generate the first region of predictive pixel values and a second motion vector chosen from a second set of motion vector candidates is used to generate the second region of predictive pixel values.

3. The decoder of claim 1, wherein:

the decoder smooths the first predictive pixel values and second predictive pixel values across the non-straight, non-rectangular partition; and

decodes the coded block by adding residual pixel values to the smoothed first and second predictive pixel values.

4. The decoder of claim 1, wherein the block is a coding tree unit.

5. The decoder of claim 1, wherein the block is $N \times N$ and N is one of 128, 64, or 32.

6. The decoder of claim 1, wherein the non-straight non-rectangular partition is a curve.

7. A decoder configured to:

receive a bit stream including a coded picture, the coded picture including a coding tree unit comprising multiple coding units and signaling information including a first partition index useful for determining the start point of a non-straight non-rectangular partition in the coding tree unit and a second partition index useful for determining the end point of the non-straight non-rectangular partition in the coding tree unit;

determine, using the first partition index and second partition index, the start point and end point of the non-straight, non-rectangular partition in the coding tree unit;

generate first predictive pixel values in a first region on a first side of the non-straight, non-rectangular partition using a first motion vector from a first set of motion vector candidates;

generate second predictive pixel values in a second region on a second side of the non-straight, non-rectangular partition using a second motion vector from a second set of motion vector candidates;

5 smooth the first predictive pixel values and second predictive pixel values across the non-straight, non-rectangular partition; and

decode the coding tree unit by adding residual pixel values to the smoothed first and second predictive pixel values.

8. The decoder of claim 7, wherein:

10 the bit stream includes a first motion vector candidate index used to identify the first motion vector from the first set of motion vector candidates; and

wherein the bitstream includes a second motion vector candidate index used to identify the second motion vector from the second set of motion vector candidates.