Amended Set of Claims 1 to 64

1. A method of coding coefficients associated with a block of video data during a video coding process, the method comprising:

determining statistics that indicate a probability of each of x- and y-coordinates comprising a given value when a scanning order associated with the block comprises a first scanning order, wherein the x- and y-coordinates indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to the scanning order, and wherein the scanning order comprises one of the first scanning order and a second scanning order that is different than the first scanning order; and

coding the x- and y-coordinates based on the statistics when the scanning order comprises the first scanning order, and interchanging the x- and y-coordinates and coding the interchanged x- and y-coordinates based on the statistics when the scanning order comprises the second scanning order,

wherein coding the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics comprises using the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order to code the x-coordinate and the interchanged y-coordinate, and using the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order to code the y-coordinate and the interchanged x-coordinate.

2. The method of claim 1, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

3. The method of claim 1, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

4. The method of claim 1, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third scanning order that is

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different than the first scanning order and the second scanning order, the method further comprising:

when the scanning order comprises the third scanning order, coding the x- and y-coordinates based on the statistics that indicate the probability of each of the x- and y-coordinates comprising the given value when the scanning order comprises the first scanning order.

5. The method of claim 4, wherein the first scanning order comprises a horizontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal scanning order, the vertical scanning order, and the zig-zag scanning order originate at a common position within the block.

6. The method of claim 1, further comprising:

updating the statistics based on the x- and y-coordinates and the interchanged x- and y-coordinates, including updating the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order using the x-coordinate and the interchanged y-coordinate, and updating the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x-coordinate.

7. The method of claim 1, wherein coding each of the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics further comprises performing a context adaptive entropy coding process that includes applying a context model that includes the statistics based on at least one context, wherein the at least one context includes one of a different one of the x- and y-coordinates, a different one of the interchanged x- and y-coordinates, and the scanning order.

8. The method of claim 7, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, and wherein coding each of the x- and y-coordinates and the interchanged x- and y-coordinates by performing the context adaptive entropy coding process that includes

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applying the context model that includes the statistics based on the different one of the x- and y-coordinates, and the different one of the interchanged x- and y-coordinates comprises:

coding at least one bin of the sequence corresponding to the respective coordinate by selecting the statistics from the context model based at least in part on a value of at least one bin of the sequence corresponding to the different one of the x- and y-coordinates, or the different one of the interchanged x- and y-coordinates.

9. The method of claim 1, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, the method further comprising coding the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.

10. The method of claim 1, further comprising:

coding information that identifies the scanning order.

11. The method of claim 10, further comprising:

coding information that identifies positions of other non-zero coefficients within the block.

12. The method of claim 1, wherein coding comprises encoding, the method further comprising:

encoding values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

outputting the encoded values of the non-zero coefficients in a bitstream.

13. The method of claim 1, wherein coding comprises decoding, the method further comprising:

receiving encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

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decoding the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

14. A method of coding coefficients associated with a block of video data during a video coding process, the method comprising:

coding x- and y-coordinates that indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to a scanning order associated with the block, wherein the scanning order comprises one of a plurality of scanning orders, wherein each of the plurality of scanning orders originates at a common position within the block, wherein coding the x- and y-coordinates comprises:

coding information that indicates whether the x-coordinate corresponds to the common position;

coding information that indicates whether the y-coordinate corresponds to the common position;

in the event the x-coordinate does not correspond to the common position, and the y-coordinate does not correspond to the common position, coding information that identifies the scanning order;

in the event the x-coordinate does not correspond to the common position, coding the x-coordinate based on the scanning order; and

in the event the y-coordinate does not correspond to the common position, coding the y-coordinate based on the scanning order.

15. The method of claim 14, wherein coding the x-coordinate and the y-coordinate based on the scanning order comprises performing a context adaptive entropy coding process that includes applying a context model based on at least one context, wherein the at least one context includes the scanning order.

16. The method of claim 14, wherein coding comprises encoding, the method further comprising:

encoding values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

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outputting the encoded values of the non-zero coefficients in a bitstream.

17. The method of claim 14, wherein coding comprises decoding, the method further comprising:

receiving encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

decoding the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

18. An apparatus for coding coefficients associated with a block of video data during a video coding process, the apparatus comprising a video coder configured to:

determine statistics that indicate a probability of each of x- and y-coordinates comprising a given value when a scanning order associated with the block comprises a first scanning order, wherein the x- and y-coordinates indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to the scanning order, and wherein the scanning order comprises one of the first scanning order and a second scanning order that is different than the first scanning order; and

code the x- and y-coordinates based on the statistics when the scanning order comprises the first scanning order, and interchange the x- and y-coordinates and code the interchanged x- and y-coordinates based on the statistics when the scanning order comprises the second scanning order,

wherein to code the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics, the video coder is configured to use the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order to code the x-coordinate and the interchanged y-coordinate, and use the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order to code the y-coordinate and the interchanged x-coordinate.

19. The apparatus of claim 18, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

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20. The apparatus of claim 18, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

21. The apparatus of claim 18, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third scanning order that is different than the first scanning order and the second scanning order, and wherein the video coder is further configured to:

when the scanning order comprises the third scanning order, code the x- and y-coordinates based on the statistics that indicate the probability of each of the x- and y-coordinates comprising the given value when the scanning order comprises the first scanning order.

22. The apparatus of claim 21, wherein the first scanning order comprises a horizontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal scanning order, the vertical scanning order, and the zig-zag scanning order originate at a common position within the block.

23. The apparatus of claim 18, wherein the video coder is further configured to:

update the statistics based on the x- and y-coordinates and the interchanged x- and y-coordinates, that includes the video coder updating the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order using the x-coordinate and the interchanged y-coordinate, and updating the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x-coordinate.

24. The apparatus of claim 18, wherein to code each of the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics, the video coder is further configured to perform a context adaptive entropy coding process that includes the video

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coder applying a context model that includes the statistics based on at least one context, wherein the at least one context includes one of a different one of the x- and y-coordinates, a different one of the interchanged x- and y-coordinates, and the scanning order.

25. The apparatus of claim 24, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, and wherein to code each of the x- and y-coordinates and the interchanged x- and y-coordinates by performing the context adaptive entropy coding process that includes the video coder applying the context model that includes the statistics based on the different one of the x- and y-coordinates, and the different one of the interchanged x- and y-coordinates, the video coder is configured to:

code at least one bin of the sequence corresponding to the respective coordinate by selecting the statistics from the context model based at least in part on a value of at least one bin of the sequence corresponding to the different one of the x- and y-coordinates, or the different one of the interchanged x- and y-coordinates.

26. The apparatus of claim 18, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, wherein the video coder is further configured to code the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.

27. The apparatus of claim 18, wherein the video coder comprises a video encoder, and wherein the video encoder is further configured to:

encode values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and output the encoded values of the non-zero coefficients in a bitstream.

28. The apparatus of claim 18, wherein the video coder comprises a video decoder, and wherein the video decoder is further configured to:

receive encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

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decode the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

29. The apparatus of claim 18, wherein the apparatus comprises at least one of:
an integrated circuit;
a microprocessor; and
a wireless communication device that includes the video coder.

30. An apparatus for coding coefficients associated with a block of video data during a video coding process, the apparatus comprising a video coder configured to:
code x- and y-coordinates that indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to a scanning order associated with the block, wherein the scanning order comprises one of a plurality of scanning orders, wherein each of the plurality of scanning orders originates at a common position within the block, and wherein to code the x- and y-coordinates, the video coder is configured to:
code information that indicates whether the x-coordinate corresponds to the common position;
code information that indicates whether the y-coordinate corresponds to the common position;
in the event the x-coordinate does not correspond to the common position, and the y-coordinate does not correspond to the common position, code information that identifies the scanning order;
in the event the x-coordinate does not correspond to the common position, code the x-coordinate based on the scanning order; and
in the event the y-coordinate does not correspond to the common position, code the y-coordinate based on the scanning order.

31. The apparatus of claim 30, wherein to code the x-coordinate and the y-coordinate based on the scanning order, the video coder is configured to perform a context adaptive entropy coding process that includes the video coder applying a

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context model based on at least one context, wherein the at least one context includes the scanning order.

32. The apparatus of claim 30, wherein the video coder comprises a video encoder, and wherein the video encoder is further configured to:

encode values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

output the encoded values of the non-zero coefficients in a bitstream.

33. The apparatus of claim 30, wherein the video coder comprises a video decoder, and wherein the video decoder is further configured to:

receive encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

decode the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

34. The apparatus of claim 30, wherein the apparatus comprises at least one of:

an integrated circuit;

a microprocessor; and

a wireless communication device that includes the video coder.

35. A device for coding coefficients associated with a block of video data during a video coding process, the device comprising:

means for determining statistics that indicate a probability of each of x- and y-coordinates comprising a given value when a scanning order associated with the block comprises a first scanning order, wherein the x- and y-coordinates indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to the scanning order, and wherein the scanning order comprises one of the first scanning order and a second scanning order that is different than the first scanning order; and

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means for coding the x- and y-coordinates based on the statistics when the scanning order comprises the first scanning order, and means for interchanging the x- and y-coordinates and coding the interchanged x- and y-coordinates based on the statistics when the scanning order comprises the second scanning order,

wherein the means for coding the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics comprises means for using the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order to code the x-coordinate and the interchanged y-coordinate, and means for using the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order to code the y-coordinate and the interchanged x-coordinate.

36. The device of claim 35, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

37. The device of claim 35, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

38. The device of claim 35, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third scanning order that is different than the first scanning order and the second scanning order, further comprising:

means for, when the scanning order comprises the third scanning order, coding the x- and y-coordinates based on the statistics that indicate the probability of each of the x- and y-coordinates comprising the given value when the scanning order comprises the first scanning order.

39. The device of claim 38, wherein the first scanning order comprises a horizontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal

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scanning order, the vertical scanning order, and the zig-zag scanning order originate at a common position within the block.

40. The device of claim 35, further comprising:

means for updating the statistics based on the x- and y-coordinates and the interchanged x- and y-coordinates, including means for updating the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order using the x-coordinate and the interchanged y-coordinate, and means for updating the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x-coordinate.

41. The device of claim 35, wherein the means for coding each of the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics further comprises means for performing a context adaptive entropy coding process that includes means for applying a context model that includes the statistics based on at least one context, wherein the at least one context includes one of a different one of the x- and y-coordinates, a different one of the interchanged x- and y-coordinates, and the scanning order.

42. The device of claim 41, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, and wherein the means for coding each of the x- and y-coordinates and the interchanged x- and y-coordinates comprising the means for performing the context adaptive entropy coding process that includes the means for applying the context model that includes the statistics based on the different one of the x- and y-coordinates, and the different one of the interchanged x- and y-coordinates comprises:

means for coding at least one bin of the sequence corresponding to the respective coordinate by selecting the statistics from the context model based at least in part on a value of at least one bin of the sequence corresponding to the different one of the x- and y-coordinates, or the different one of the interchanged x- and y-coordinates.

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43. The device of claim 35, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, further comprising means for coding the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.

44. The device of claim 35, wherein the means for coding comprises means for encoding, the device further comprising:

means for encoding values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

means for outputting the encoded values of the non-zero coefficients in a bitstream.

45. The device of claim 35, wherein the means for coding comprises means for decoding, the device further comprising:

means for receiving encoded values of non-zero coefficients associated with the block of video data in a bitstream; and means for decoding the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

46. A device for coding coefficients associated with a block of video data during a video coding process, the device comprising:

means for coding x- and y-coordinates that indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to a scanning order associated with the block, wherein the scanning order comprises one of a plurality of scanning orders, wherein each of the plurality of scanning orders originates at a common position within the block, wherein the means for coding the x- and y-coordinates comprises:

means for coding information that indicates whether the x-coordinate corresponds to the common position;

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means for coding information that indicates whether the y-coordinate corresponds to the common position;

means for, in the event the x-coordinate does not correspond to the common position, and the y-coordinate does not correspond to the common position, coding information that identifies the scanning order;

means for, in the event the x-coordinate does not correspond to the common position, coding the x-coordinate based on the scanning order; and

means for, in the event the y-coordinate does not correspond to the common position, coding the y-coordinate based on the scanning order.

47. The device of claim 46, wherein the means for coding the x-coordinate and the y-coordinate based on the scanning order comprises means for performing a context adaptive entropy coding process that includes means for applying a context model based on at least one context, wherein the at least one context includes the scanning order.

48. The device of claim 46, wherein the means for coding comprises means for encoding, the device further comprising means for encoding values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

means for outputting the encoded values of the non-zero coefficients in a bitstream.

49. The device of claim 46, wherein the means for coding comprises means for decoding, the device further comprising:

means for receiving encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

means for decoding the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

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50. A computer-readable medium comprising instructions that, when executed, cause a processor to code coefficients associated with a block of video data during a video coding process, wherein the instructions cause the processor to:

determine statistics that indicate a probability of each of x- and y-coordinates comprising a given value when a scanning order associated with the block comprises a first scanning order, wherein the x- and y-coordinates indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to the scanning order, and wherein the scanning order comprises one of the first scanning order and a second scanning order that is different than the first scanning order; and

code the x- and y-coordinates based on the statistics when the scanning order comprises the first scanning order, and interchange the x- and y-coordinates and code the interchanged x- and y-coordinates based on the statistics when the scanning order comprises the second scanning order,

wherein the instructions that cause the processor to code the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics comprise instructions that cause the processor to use the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order to code the x-coordinate and the interchanged y-coordinate, and use the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order to code the y-coordinate and the interchanged x-coordinate.

51. The computer-readable medium of claim 50, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

52. The computer-readable medium of claim 50, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

53. The computer-readable medium of claim 50, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third

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scanning order that is different than the first scanning order and the second scanning order, further comprising instructions that cause the processor to:

when the scanning order comprises the third scanning order, code the x- and y-coordinates based on the statistics that indicate the probability of each of the x- and y-coordinates comprising the given value when the scanning order comprises the first scanning order.

54. The computer-readable medium of claim 53, wherein the first scanning order comprises a horizontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal scanning order, the vertical scanning order, and the zig-zag scanning order originate at a common position within the block.

55. The computer-readable medium of claim 50, further comprising instructions that cause the processor to:

update the statistics based on the x- and y-coordinates and the interchanged x- and y-coordinates, including instructions that cause the processor to update the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order using the x-coordinate and the interchanged y-coordinate, and instructions that cause the processor to update the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x-coordinate.

56. The computer-readable medium of claim 50, wherein the instructions that cause the processor to code each of the x- and y-coordinates and the interchanged x- and y-coordinates based on the statistics further comprise instructions that cause the processor to perform a context adaptive entropy coding process that includes applying a context model that includes the statistics based on at least one context, wherein the at least one context includes one of a different one of the x- and y-coordinates, a different one of the interchanged x- and y-coordinates, and the scanning order.

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57. The computer-readable medium of claim 56, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, and wherein the instructions that cause the processor to code each of the x- and y-coordinates and the interchanged x- and y-coordinates comprising the instructions that cause the processor to perform the context adaptive entropy coding process that includes applying the context model that includes the statistics based on the different one of the x- and y-coordinates, and the different one of the interchanged x- and y-coordinates, comprise instructions that cause the processor to:

code at least one bin of the sequence corresponding to the respective coordinate by selecting the statistics from the context model based at least in part on a value of at least one bin of the sequence corresponding to the different one of the x- and y-coordinates, or the different one of the interchanged x- and y-coordinates.

58. The computer-readable medium of claim 50, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, further comprising instructions that cause the processor to code the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.

59. The computer-readable medium of claim 50, wherein coding comprises encoding, the computer-readable medium further comprising instructions that cause the processor to:

encode values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

output the encoded values of the non-zero coefficients in a bitstream.

60. The computer-readable medium of claim 50, wherein coding comprises decoding, the computer-readable medium further comprising instructions that cause the processor to:

receive encoded values of non-zero coefficients associated with the block of video data in a bitstream; and decode the encoded values of the non-zero coefficients

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based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

61. A computer-readable medium comprising instructions that, when executed, cause a processor to code coefficients associated with a block of video data during a video coding process, wherein the instructions cause the processor to:

code x- and y-coordinates that indicate a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block according to a scanning order associated with the block, wherein the scanning order comprises one of a plurality of scanning orders, wherein each of the plurality of scanning orders originates at a common position within the block, wherein the instructions that cause the processor to code the x- and y-coordinates comprise instructions that cause the processor to:

code information that indicates whether the x-coordinate corresponds to the common position;

code information that indicates whether the y-coordinate corresponds to the common position;

in the event the x-coordinate does not correspond to the common position, and the y-coordinate does not correspond to the common position, code information that identifies the scanning order;

in the event the x-coordinate does not correspond to the common position, code the x-coordinate based on the scanning order; and

in the event the y-coordinate does not correspond to the common position, code the y-coordinate based on the scanning order.

62. The computer-readable medium of claim 61, wherein the instructions that cause the processor to code the x-coordinate and the y-coordinate based on the scanning order comprise instructions that cause the processor to perform a context adaptive entropy coding process that includes applying a context model based on at least one context, wherein the at least one context includes the scanning order.

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63. The computer-readable medium of claim 61, wherein coding comprises encoding, the computer-readable medium further comprising instructions that cause the processor to:

encode values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

output the encoded values of the non-zero coefficients in a bitstream.

64. The computer-readable medium of claim 61, wherein coding comprises decoding, the computer-readable medium further comprising instructions that cause the processor to:

receive encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

decode the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

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CLAIMS

1. A method of coding coefficients associated with a block of video data during a video coding process, the method comprising:

determining contexts for performing context adaptive entropy coding of the x- and y-coordinates indicating a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block, wherein the contexts indicate a probability of each of x- and y-coordinates comprising a given value when the coefficients of the block of video data are scanned in a first scanning order;

when the coefficients of the block of video data are scanned in the first scanning order, coding the x-coordinate and the y-coordinate using the determined contexts such that the x-coordinate is coded based on the probability of the x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value; and

interchanging the x- and y-coordinates when the coefficients of the block of video data are scanned in the second scanning order and coding the interchanged x-coordinate and the interchanged y-coordinate using the determined contexts such that the interchanged x-coordinate is coded based on the probability of the y-coordinate comprising a given value and the interchanged y-coordinate is coded based on the probability of the x-coordinate comprising a given value.

2. The method of claim **1**, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

3. The method of claim **1**, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

4. The method of claim **1**, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third scanning order that is different than the first scanning order and the second scanning order, the method further comprising:

when the scanning order comprises the third scanning order, coding the x- and y-coordinates using the determined contexts such that the x-coordinate is coded based on the probability of the x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value.

5. The method of claim **4**, wherein the first scanning order comprises a horizontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal scanning order, the vertical scanning order, and the zig-zag scanning order originate at a common position within the block.

6. The method of claim **1**, further comprising:

updating the contexts based on the x- and y-coordinates and the interchanged x- and y-coordinates, including updating the probability of the x-coordinate comprising [the given value when the scanning order comprises the first scanning order using the x-coordinate and the inter-

changed y-coordinate, and updating the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x-coordinate.

7. The method of claim **1**, wherein coding the x- and y-coordinates and the interchanged x- and y-coordinates comprises coding a sequence of one or more bins, wherein the contexts indicate probabilities of each of the bins having a given value.

8. The method of claim **1**, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, the method further comprising coding the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.

9. The method of claim **1**, further comprising:

coding information that identifies the scanning order.

10. The method of claim **9**, further comprising:

coding information that identifies positions of other non-zero coefficients within the block.

11. The method of claim **1**, wherein coding comprises encoding, the method further comprising:

encoding values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

outputting the encoded values of the non-zero coefficients in a bitstream.

12. The method of claim **1**, wherein coding comprises decoding, the method further comprising:

receiving encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

decoding the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

13. An apparatus for coding coefficients associated with a block of video data during a video coding process, the apparatus comprising a video coder configured to:

determine contexts for performing context adaptive entropy coding of the x- and y-coordinates indicating a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block, wherein the contexts indicate a probability of each of x- and y-coordinates comprising a given value when the coefficients of the block of video data are scanned in a first scanning order;

when the coefficients of the block of video data are scanned in the first scanning order, code the x-coordinate and the y-coordinate using the determined contexts such that the x-coordinate is coded based on the probability of the x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value; and

interchange the x- and y-coordinates when the coefficients of the block of video data are scanned in the second scanning order and code the interchanged x-coordinate and the interchanged y-coordinate using the determined contexts such that the interchanged x-coordinate is coded based on the probability of the y-coordinate comprising a given value and the interchanged y-coordinate is coded based on the probability of the x-coordinate comprising a given value.

14. The apparatus of claim **13**, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

15. The apparatus of claim **13**, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

16. The apparatus of claim **13**, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third scanning order that is different than the first scanning order and the second scanning order, and wherein the video coder is further configured to:

when the scanning order comprises the third scanning order, code the x- and y-coordinates using the determined contexts such that the x-coordinate is coded based on the probability of the x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value.

17. The apparatus of claim **16**, wherein the first scanning order comprises a horizontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal scanning order, the vertical scanning order, and the zig-zag scanning order originate at a common position within the block.

18. The apparatus of claim **13**, wherein the video coder is further configured to:

update the contexts based on the x- and y-coordinates and the interchanged x- and y-coordinates, that includes the video coder updating the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order using the x-coordinate and the interchanged y-coordinate, and updating the probability of the y-coordinate comprising the given

value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x-coordinate.

19. The apparatus of claim **13**, wherein to code each of the x-and y-coordinates and the interchanged x- and y-coordinates, the video coder is configured to code a sequence of one or more bins, wherein the contexts indicate probabilities of each of the bins having a given value.

20. The apparatus of claim **13**, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, wherein the video coder is further configured to code the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.

21. The apparatus of claim **13**, wherein the apparatus comprises at least one of:

an integrated circuit;

a microprocessor; or

a wireless communication device that includes the video coder.

22. The apparatus of claim **13**, wherein the video coder comprises a video encoder, and wherein the video encoder is further configured to:

encode values of non-zero coefficients associated with the block of video data based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates; and

output the encoded values of the non-zero coefficients in a bitstream.

23. The apparatus of claim **13**, wherein the video coder comprises a video decoder, and wherein the video decoder is further configured to:

receive encoded values of non-zero coefficients associated with the block of video data in a bitstream; and

decode the encoded values of the non-zero coefficients based on the respective ones of the x- and y-coordinates and the interchanged x- and y-coordinates.

24. A device for coding coefficients associated with a block of video data during a video coding process, the device comprising:

means for determining contexts for performing context adaptive entropy coding of the x-and y-coordinates indicating a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block, wherein the contexts indicate a probability of each of x-and y-coordinates comprising a given value when the coefficients of the block of video data are scanned in a first scanning order;

when the coefficients of the block of video data are scanned in the first scanning order, means for coding the x-coordinate and the y-coordinate using the determined contexts such that the x-coordinate is coded based on the probability of the x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value; and

means for interchanging the x- and y-coordinates when the coefficients of the block of video data are scanned in the second scanning order and coding the interchanged x-coordinate and the interchanged y-coordinate using the determined contexts such that the interchanged x-coordinate is coded based on the probability of the y-coordinate comprising a given value and the interchanged y-coordinate is coded based on the probability of the x-coordinate comprising a given value.

25. The device of claim **24**, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

26. The device of claim **24**, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

27. The device of claim **24**, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third scanning order that is different than the first scanning order and the second scanning order, further comprising:

means for, when the scanning order comprises the third scanning order, coding the x- and y-coordinates using the determined contexts such that the x-coordinate is coded based on the probability of the x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value.

28. The device of claim **27**, wherein the first scanning order comprises a horizontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal scanning order, the vertical scanning order, and the zig-zag scanning order originate at a common position within the block.

29. The device of claim **24**, further comprising:

means for updating the contexts based on the x- and y-coordinates and the interchanged x- and y-coordinates, including means for updating the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order using the x-coordinate and the interchanged y-coordinate, and means

for updating the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x-coordinate.

30. The device of claim **24**, wherein the means for coding the x- and y-coordinates and the interchanged x- and y-coordinates comprises means for coding a sequence of one or more bins, wherein the contexts indicate probabilities of each of the bins having a given value.

31. The device of claim **24**, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, further comprising means for coding the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.

32. A non-transitory computer-readable medium comprising instructions that, when executed, cause a processor to code coefficients associated with a block of video data during a video coding process, wherein the instructions cause the processor to:

determine contexts for performing context adaptive entropy coding of the x- and y-coordinates indicating a horizontal position and a vertical position, respectively, of a last non-zero coefficient within the block, wherein the contexts indicate a probability of each of x- and y-coordinates comprising a given value when the coefficients of the block of video data are scanned in a first scanning order;

when the coefficients of the block of video data are scanned in the first scanning order, code the x-coordinate and the y-coordinate using the determined contexts such that the x-coordinate is coded based on the probability of the

x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value; and

interchange the x- and y-coordinates when the coefficients of the block of video data are scanned in the second scanning order and code the interchanged x-coordinate and the interchanged y-coordinate using the determined contexts such that the interchanged x-coordinate is coded based on the probability of the y-coordinate comprising a given value and the interchanged y-coordinate is coded based on the probability of the x-coordinate comprising a given value.

33. The non-transitory computer-readable medium of claim **32**, wherein the first scanning order and the second scanning order are symmetrical with respect to one another.

34. The non-transitory computer-readable medium of claim **32**, wherein the first scanning order comprises a horizontal scanning order and the second scanning order comprises a vertical scanning order, and wherein the horizontal scanning order and the vertical scanning order originate at a common position within the block.

35. The non-transitory computer-readable medium of claim **32**, wherein the scanning order further comprises one of the first scanning order, the second scanning order, and a third scanning order that is different than the first scanning order and the second scanning order, further comprising instructions that cause the processor to:

when the scanning order comprises the third scanning order, code the x- and y-coordinates using the determined contexts such that the x-coordinate is coded based on the probability of the x-coordinate comprising a given value and the y-coordinate is coded based on the probability of the y-coordinate comprising a given value.

36. The non-transitory computer-readable medium of claim **35**, wherein the first scanning order comprises a hori-

zontal scanning order, the second scanning order comprises a vertical scanning order, and the third scanning order comprises a zig-zag scanning order, wherein the horizontal scanning order, the vertical scanning order, and the zig -zag scanning order originate at a common position within the block.

37. The non-transitory computer-readable medium of claim **32**, further comprising instructions that cause the processor to:

update the contexts based on the x- and y-coordinates and the interchanged x- and y-coordinates, including instructions that cause the processor to update the probability of the x-coordinate comprising the given value when the scanning order comprises the first scanning order using the x-coordinate and the interchanged y-coordinate, and instructions that cause the processor to update the probability of the y-coordinate comprising the given value when the scanning order comprises the first scanning order using the y-coordinate and the interchanged x -coordinate.

38. The non-transitory computer-readable medium of claim **32**, wherein the instructions that cause the processor to code the x- and y-coordinates and the interchanged x- and y-coordinates comprise instructions that cause the processor to code a sequence of one or more bins, wherein the contexts indicate probabilities of each of the bins having a given value.

39. The non-transitory computer-readable medium of claim **32**, wherein each of the x- and y-coordinates and the interchanged x- and y-coordinates comprises a sequence of one or more bins, further comprising instructions that cause the processor to code the one or more bins of the sequence corresponding to one of the coordinates and the one or more bins of the sequence corresponding to the other coordinate in an interleaved manner.