Amended Set of Claims 1 to 49

1. A method of coding a plurality of transform coefficients associated with residual video data in a video coding process, the method comprising:

coding information indicating significant coefficients for the plurality of transform coefficients according to a scan order; and

coding information indicating levels of significant coefficients of the plurality of transform coefficients according to the scan order,

wherein the scan order includes both scan pattern and scan direction.

2. The method of claim 1, wherein the video coding process uses context adaptive binary arithmetic coding (CABAC).

3. The method of claim 1, wherein the plurality of transform coefficients are arranged in a block.

4. The method of claim 1, wherein the scan order comprises a scan direction, and wherein the scan direction is an inverse scan direction proceeding from higher frequency coefficients in the plurality of transform coefficients to lower frequency coefficients in the plurality of transform coefficients.

5. The method of claim 1, wherein the scan order comprises a scan pattern, and wherein the scan pattern comprises one of a sub-block pattern, diagonal pattern, zig-zag pattern, horizontal pattern or vertical pattern.

6. The method of claim 2, further comprising:

determining contexts for coding the levels of the significant coefficients for a plurality of sub-sets of the significant coefficients, wherein each of the plurality of sub-sets comprises one or more coefficients scanned according to the scan order.

7. The method of claim 6, further comprising;

deriving a first context for a first block of the transform coefficients, the first block having a first size, according to context derivation criteria; and

deriving a second context for a second block of the transform coefficients, the second block having a second, different size, according to the same context derivation criteria as the first block.

8. The method of claim 6, further comprising deriving contexts for coding the levels of significant coefficients of a plurality of blocks of video data, wherein context derivation criteria used to derive the contexts is the same for all of the plurality of blocks of video data regardless of a size of a particular block.

9. The method of claim 6, further comprising selecting different sets of contexts for different sub-sets of the coefficients based on whether the respective sub-sets contain a DC coefficient of the transform coefficients.

10. The method of claim 6, further comprising selecting different sets of contexts for different sub-sets of the coefficients based on a weighted number of significant coefficients in other preceding sub-sets of the coefficients.

11. The method of claim 6, further comprising selecting different sets of contexts for different sub-set of the coefficients based on a number of significant coefficients in a current sub-set.

12. The method of claim 6, further comprising selecting a unique set of contexts for a sub-set containing a last significant coefficient.

13. A system configured to code a plurality of transform coefficients associated with residual video data in a video coding process, the system comprising:

a video coding processor configured to code information indicating significant coefficients for the plurality of transform coefficients according to a scan order, and further configured to code information indicating levels of the significant coefficients for the plurality of transform coefficients according to the scan order,

wherein the scan order includes both scan pattern and scan direction.

14. The system of claim 13, wherein the video coding processor uses context adaptive binary arithmetic coding (CABAC) to code the information indicating

significant coefficients and to code the information indicating the levels of the significant coefficients.

15. The system of claim 13, wherein the plurality of transform coefficients are arranged in a block.

16. The system of claim 13, wherein the scan order comprises a scan direction, and wherein the scan direction is an inverse scan direction proceeding from higher frequency coefficients in the plurality of transform coefficients to lower frequency coefficients in the plurality of transform coefficients.

17. The system of claim 13, wherein the scan order comprises a scan pattern, and wherein the scan pattern comprises one of a sub-block pattern, diagonal pattern, zig-zag pattern, horizontal pattern or vertical pattern.

18. The system of claim 14, wherein the video coding processor is further configured to determine contexts for coding the levels of the significant coefficients for a plurality of sub-sets of the significant coefficients, wherein each of the plurality of sub-sets comprises one or more coefficients scanned according to the scan order.

19. The system of claim 18, wherein the video coding processor is further configured to derive a first context for a first block of the transform coefficients, the first block having a first size, according to context derivation criteria, and wherein the video coding unit is further configured to derive a second context for a second block of the transform coefficients, the second block having a second, different size, according to the same context derivation criteria as the first block.

20. The system of claim 18, wherein the video coding processor is further configured to derive contexts for coding the levels of significant coefficients of a plurality of blocks of video data, wherein context derivation criteria used to derive the contexts is the same for all of the plurality of blocks of video data regardless of a size of a particular block.

21. The system of claim 18, wherein the video coding processor is further configured to select different sets of contexts for different sub-sets of the coefficients based on whether the respective sub-sets contain a DC coefficient of the transform coefficients.

22. The system of claim 18, wherein the video coding processor is further configured to select different sets of contexts for different sub-sets of the coefficients based on a weighted number of significant coefficients in other preceding sub-sets of the coefficients.

23. The system of claim 18, wherein the video coding processor is further configured to select different sets of contexts for different sub-set of the coefficients based on a number of significant coefficients in a current sub-set.

24. The system of claim 18, wherein the video coding processor is further configured to select a unique set of contexts for a sub-set containing a last significant coefficient.

25. The system of claim 13, wherein the video coding processor is part of a video encoder.

26. A system for coding a plurality of transform coefficients associated with residual video data in a video coding process, the system comprising:

means for coding information indicating significant coefficients ~~for~~ of the plurality of transform coefficients according to a scan order; and

means for coding information indicating levels of the significant coefficients for the plurality of transform coefficients according to the scan order,

wherein the scan order includes both scan pattern and scan direction.

27. The system of claim 26, wherein each means for coding uses context adaptive binary arithmetic coding (CABAC).

28. The system of claim 26, wherein the plurality of transform coefficients are arranged in a block.

29. The system of claim 28, wherein the scan order comprises a scan direction, and wherein the scan direction is an inverse scan direction proceeding from higher frequency coefficients in the plurality of transform coefficients to lower frequency coefficients in the plurality of transform coefficients.

30. The system of claim 28, wherein the scan order comprises a scan pattern, and wherein the scan pattern comprises one of a sub-block pattern, diagonal pattern, zig-zag pattern, horizontal pattern or vertical pattern.

31. The system of claim 26, further comprising:

means for determining contexts for coding the levels of the significant coefficients for a plurality of sub-sets of the significant coefficients, wherein each of the plurality of sub-sets comprises one or more coefficients scanned according to the scan order.

32. The system of claim 31, further comprising;

means for deriving a first context for a first block of the transform coefficients, the first block having a first size, according to context derivation criteria; and

means for deriving a second context for a second block of the transform coefficients, the second block having a second, different size, according to the same context derivation criteria as the first block.

33. The system of claim 31, further comprising means for deriving contexts for coding the levels of significant coefficients of a plurality of blocks of video data, wherein context derivation criteria used to derive the contexts is the same for all of the plurality of blocks of video data regardless of a size of a particular block.

34. The system of claim 31, further comprising:

means for selecting different sets of contexts for different sub-sets of the coefficients based on whether the respective sub-sets contain a DC coefficient of the transform coefficients.

35. The system of claim 31, further comprising:

means for selecting different sets of contexts for different sub-sets of the coefficients based on a weighted number of significant coefficients in other preceding sub-sets of the coefficients.

36. The system of claim 31, further comprising mean for selecting different sets of contexts for different sub-set of the coefficients based on a number of significant coefficients in a current sub-set.

37. The system of claim 31, further comprising means for selecting a unique set of contexts for a sub-set containing a last significant coefficient.

38. A computer program product comprising a computer-readable storage medium having stored thereon instructions that, when executed, cause a processor of a device for coding a plurality of transform coefficients associated with residual video data in a video coding process to:

code information indicating significant coefficients for the plurality of transform coefficients according to a scan order; and

code information indicating levels of the significant coefficients for the plurality of transform coefficients according to the scan order,

wherein the scan order includes both scan pattern and scan direction.

39. The computer program product of claim 38, wherein the instructions for coding use context adaptive binary arithmetic coding (CABAC).

40. The computer program product of claim 38, wherein the plurality of transform coefficients are arranged in a block.

41. The computer program product of claim 40, wherein the scan order comprises a scan direction, and wherein the scan direction is an inverse scan direction proceeding from higher frequency coefficients in the plurality of transform coefficients to lower frequency coefficients in the plurality of transform coefficients.

42. The computer program product of claim 40, wherein the scan order comprises a scan pattern, and wherein the scan pattern comprises one of a sub-block pattern, diagonal pattern, zig-zag pattern, horizontal pattern or vertical pattern.

43. The computer program product of claim 38, further causing a processor to:

determine contexts for coding the levels of the significant coefficients for a plurality of sub-sets of the significant coefficients, wherein each of the plurality of sub-sets comprises one or more coefficients scanned according to the scan order.

44. The computer program product of claim 43, further causing a processor to:

derive a first context for a first block of the transform coefficients, the first block having a first size, according to context derivation criteria; and

derive a second context for a second block of the transform coefficients, the second block having a second, different size, according to the same context derivation criteria as the first block.

45. The computer program product of claim 43, further causing a processor to:

derive contexts for coding the levels of significant coefficients of a plurality of blocks of video data, wherein context derivation criteria used to derive the contexts is the same for all of the plurality of blocks of video data regardless of a size of a particular block.

46. The computer program product of claim 43, further causing a processor to:

select different sets of contexts for different sub-sets of the coefficients based on whether the respective sub-sets contain a DC coefficient of the transform coefficients.

47. The computer program product of claim 43, further causing a processor to:

select different sets of contexts for different sub-sets of the coefficients based on a weighted number of significant coefficients in other preceding sub-sets of the coefficients.

48. The computer program product of claim 43, further causing a processor to:

select different sets of contexts for different sub-set of the coefficients based on a number of significant coefficients in a current sub-set.

49. The computer program product of claim 43, further causing a processor to:

select a unique set of contexts for a sub-set containing a last significant coefficient.

Claims

1. A method of coding a plurality of transform coefficients associated with residual video data in a video coding process, the method comprising:

coding information indicating significant coefficients for the plurality of transform coefficients according to a scan order in a first scan pass; and

coding information indicating levels of significant coefficients of the plurality of transform coefficients according to the scan order used for coding the information indicating significant coefficients in a second scan pass,

wherein the scan order includes both scan pattern and scan direction.

2. The method of claim 1, wherein the video coding process uses context adaptive binary arithmetic coding (CABAC).

3. The method of claim 1, wherein the plurality of transform coefficients are arranged in a block.

4. The method of claim 1, wherein the scan order comprises a scan direction, and wherein the scan direction is an inverse scan direction proceeding from higher frequency coefficients in the plurality of transform coefficients to lower frequency coefficients in the plurality of transform coefficients.

5. The method of claim 1, wherein the scan order comprises a scan pattern, and wherein the scan pattern comprises one of a sub-block pattern, diagonal pattern, zig-zag pattern, horizontal pattern or vertical pattern.

6. The method of claim 2, further comprising:

determining contexts for coding the levels of the significant coefficients for a plurality of sub-sets of the significant coefficients, wherein each of the plurality of sub-sets comprises one or more coefficients scanned according to the scan order.

7. The method of claim 6, further comprising;

deriving a first context for a first block of the transform coefficients, the first block having a first size, according to context derivation criteria; and

deriving a second context for a second block of the transform coefficients, the second block having a second, different size, according to the same context derivation criteria as the first block.

8. The method of claim 6, further comprising deriving contexts for coding the levels of significant coefficients of a plurality of blocks of video data, wherein context derivation criteria used to derive the contexts is the same for all of the plurality of blocks of video data regardless of a size of a particular block.

9. The method of claim 6, further comprising selecting different sets of contexts for different sub-sets of the coefficients based on whether the respective sub-sets contain a DC coefficient of the transform coefficients.

10. The method of claim 6, further comprising selecting different sets of contexts for different sub-sets of the coefficients based on a weighted number of significant coefficients in other preceding sub-sets of the coefficients.

11. The method of claim 6, further comprising selecting different sets of contexts for different sub-set of the coefficients based on a number of significant coefficients in a current sub-set.

12. The method of claim 6, further comprising selecting a unique set of contexts for a sub-set containing a last significant coefficient.

13. A system configured to code a plurality of transform coefficients associated with residual video data in a video coding process, the system comprising:

a memory configured to store the plurality of transform coefficients; and

a video coding processor configured to code information indicating significant coefficients for the plurality of transform coefficients according to a scan order in a first scan pass, and further configured to code information indicating levels of the significant coefficients for the plurality of transform coefficients according to the scan order used for coding the information indicating significant coefficients in a second scan pass,

wherein the scan order includes both scan pattern and scan direction.

14. The system of claim 13, wherein the video coding processor uses context adaptive binary arithmetic coding (CABAC) to code the information indicating significant coefficients and to code the information indicating the levels of the significant coefficients.

15. The system of claim 13, wherein the plurality of transform coefficients are arranged in a block.

16. The system of claim 13, wherein the scan order comprises a scan direction, and wherein the scan direction is an inverse scan direction proceeding from higher frequency coefficients in the plurality of transform coefficients to lower frequency coefficients in the plurality of transform coefficients.

17. The system of claim 13, wherein the scan order comprises a scan pattern, and wherein the scan pattern comprises one of a sub-block pattern, diagonal pattern, zig-zag pattern, horizontal pattern or vertical pattern.

18. The system of claim 14, wherein the video coding processor is further configured to determine contexts for coding the levels of the significant coefficients for a plurality of sub-sets of the significant coefficients, wherein each of the plurality of sub-sets comprises one or more coefficients scanned according to the scan order.

19. The system of claim 18, wherein the video coding processor is further configured to derive a first context for a first block of the transform coefficients, the first block having a first size, according to context derivation criteria, and wherein the video coding unit is further configured to derive a second context for a second block of the transform coefficients, the second block having a second, different size, according to the same context derivation criteria as the first block.

20. The system of claim 18, wherein the video coding processor is further configured to derive contexts for coding the levels of significant coefficients of a plurality of blocks of video data, wherein context derivation criteria used to derive the

contexts is the same for all of the plurality of blocks of video data regardless of a size of a particular block.

21. The system of claim 18, wherein the video coding processor is further configured to select different sets of contexts for different sub-sets of the coefficients based on whether the respective sub-sets contain a DC coefficient of the transform coefficients.

22. The system of claim 18, wherein the video coding processor is further configured to select different sets of contexts for different sub-sets of the coefficients based on a weighted number of significant coefficients in other preceding sub-sets of the coefficients.

23. The system of claim 18, wherein the video coding processor is further configured to select different sets of contexts for different sub-set of the coefficients based on a number of significant coefficients in a current sub-set.

24. The system of claim 18, wherein the video coding processor is further configured to select a unique set of contexts for a sub-set containing a last significant coefficient.

25. The system of claim 13, wherein the video coding processor is part of a video encoder.

26. A system for coding a plurality of transform coefficients associated with residual video data in a video coding process, the system comprising:

means for coding information indicating significant coefficients of the plurality of transform coefficients according to a scan order in a first scan pass; and

means for coding information indicating levels of the significant coefficients for the plurality of transform coefficients according to the scan order used for coding the information indicating significant coefficients in a second scan pass,

wherein the scan order includes both scan pattern and scan direction.

27. The system of claim 26, wherein each means for coding uses context adaptive binary arithmetic coding (CABAC).

28. The system of claim 26, wherein the plurality of transform coefficients are arranged in a block.

29. The system of claim 28, wherein the scan order comprises a scan direction, and wherein the scan direction is an inverse scan direction proceeding from higher frequency coefficients in the plurality of transform coefficients to lower frequency coefficients in the plurality of transform coefficients.

30. The system of claim 28, wherein the scan order comprises a scan pattern, and wherein the scan pattern comprises one of a sub-block pattern, diagonal pattern, zig-zag pattern, horizontal pattern or vertical pattern.

31. The system of claim 26, further comprising:

means for determining contexts for coding the levels of the significant coefficients for a plurality of sub-sets of the significant coefficients, wherein each of the plurality of sub-sets comprises one or more coefficients scanned according to the scan order.

32. The system of claim 31, further comprising;

means for deriving a first context for a first block of the transform coefficients, the first block having a first size, according to context derivation criteria; and

means for deriving a second context for a second block of the transform coefficients, the second block having a second, different size, according to the same context derivation criteria as the first block.

33. The system of claim 31, further comprising means for deriving contexts for coding the levels of significant coefficients of a plurality of blocks of video data, wherein context derivation criteria used to derive the contexts is the same for all of the plurality of blocks of video data regardless of a size of a particular block.

34. The system of claim 31, further comprising:

means for selecting different sets of contexts for different sub-sets of the coefficients based on whether the respective sub-sets contain a DC coefficient of the transform coefficients.

35. The system of claim 31, further comprising:

means for selecting different sets of contexts for different sub-sets of the coefficients based on a weighted number of significant coefficients in other preceding sub-sets of the coefficients.

36. The system of claim 31, further comprising mean for selecting different sets of contexts for different sub-set of the coefficients based on a number of significant coefficients in a current sub-set.

37. The system of claim 31, further comprising means for selecting a unique set of contexts for a sub-set containing a last significant coefficient.

38. A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause one or more processors to perform a method according to any one of claims 1 to 12.

39. The system of claim 13, wherein the video coding processor is a video decoding processor, and wherein the video decoding processor is further configured to:

inverse transform the plurality of transform coefficients to produce a block of residual video data;

perform a prediction process on the block of residual video data to identify predictive video data; and

combine the predictive video data with the block of residual video data to produce decoded video data.