

We claim:

1. A method in a computing device with a video encoder or image encoder, the method comprising:

encoding video in a sequence, including switching color spaces spatially or temporally between at least some units of the video within the sequence during the encoding, the color spaces at least including an RGB-type color space and a YCoCg color space, wherein the encoding comprises:

for lossy coding, using color space conversion operations to switch between the RGB-type color space and the YCoCg color space; and

for lossless coding, using invertible color space conversion operations and an increased intermediate bit depth to switch between the RGB-type color space and the YCoCg color space; and

outputting encoded data in a bitstream, the encoded data including one or more signals indicating how the color spaces switch between the at least some units of the video within the sequence.

2. A method in a computing device with a video decoder or image decoder, the method comprising:

receiving encoded data in a bitstream, the encoded data including one or more signals indicating how color spaces switch between at least some units of video within a sequence, the color spaces at least including an RGB-type color space and a YCoCg color space, wherein the one or more signals include a flag value for a given unit of the units of the video, the flag value having been entropy coded using context-adaptive binary arithmetic coding, and wherein the flag value indicates a selection between the RGB-type color space and the YCoCg color space for the given unit, wherein at least some of the encoded data has been encoded with lossy coding that uses color space conversion operations to switch between the RGB-type color space and the YCoCg color space, and at least some of the encoded data has been encoded with lossless coding that uses invertible color space conversion operations and an increased intermediate bit depth to switch between the RGB-type color space and the YCoCg color space; and

decoding the encoded data, including entropy decoding the flag value and switching the color spaces spatially or temporally between the at least some units of the video within the sequence during the decoding.

3. The method of claim 1 or 2 wherein the units of the video are pictures of the sequence.

4. The method of claim 1 or 2 wherein the units of the video are slices of a given picture of the sequence.

5. The method of claim 1 or 2 wherein the units of the video are transform blocks of a given picture of the sequence.

6. The method of any one of claims 1-5 wherein the switching includes changing between three color spaces using color space transformation operations.

7. The method of claim 6 wherein the color spaces further include at least one YUV-type color space and at least one RGB-type color space.

8. The method of any one of claims 1-5 wherein the switching further includes changing between two of the color spaces using color space reordering operations.

9. The method of claim 8 wherein the color spaces further include multiple RGB-type color spaces.

10. The method of any one of claims 1-5 wherein the encoded data further includes information identifying or defining the color spaces.

11. The method of claim 10 wherein the information includes a matrix of values usable for color space transformation operations between two of the color spaces.

12. The method of any one of claims 1-11 wherein the switching further includes changing color sampling rates.

13. The method of claim 12 wherein the color sampling rates include two or more of 4:4:4, 4:2:2, 4:2:0 and 4:0:0.

14. The method of any one of claims 1-13 wherein the switching further includes changing bit depths.

15. The method of claim 14 wherein the bit depths include two or more of 12 bits per sample, 10 bits per sample and 8 bits per sample.

16. The method of claim 14 wherein different color components of a given unit of the units of the video have different bit depths.

17. The method of claim 1 wherein the one or more signals include a flag value for a given unit of the units of the video, the flag value indicates a selection between two options for the color spaces, color sampling rates or bit depths, and wherein the encoding includes entropy coding the flag value using context-adaptive binary arithmetic coding.

18. The method of claim 1 wherein the one or more signals include a syntax element for a given unit of the units of the video, the syntax element indicating a selection between three or more options for the color spaces, color sampling rates or bit depths.

19. The method of claim 1 wherein the one or more signals include a delta value for a parameter for a given unit of the units of the video, the delta value representing a difference between an actual value of the parameter and its predictor.

20. The method of claim 19 wherein the predictor is a sequence layer parameter.

21. The method of claim 19 wherein the predictor is based on one or more actual values of the parameter for one or more previous units among the units of the video.

22. The method of any one of claims 1-21 wherein the encoding or decoding includes prediction of sample values of a current block in a current picture based at least in part on a set of sample values of previously reconstructed content, wherein the set of sample values of the previously reconstructed content are stored in a first format, and wherein the sample values of the current block are encoded in a second format different than the first format.

23. The method of claim 22 wherein the prediction includes:
converting the set of sample values of the previously reconstructed content from the first format to the second format;
predicting the sample values of the current block using the set of converted sample values of the previously reconstructed content; and
reconstructing the sample values of the current block based at least in part on the predicted sample values of the current block.

24. The method of claim 23 wherein the converting from the first format to the second format includes converting between two color spaces, converting between two color sampling rates, or converting between two bit depths.

25. The method of claim 22 wherein the prediction includes:
predicting the sample values of the current block using the set of sample values of the previously reconstructed content;
converting the predicted sample values of the current block from the first format to the second format; and
reconstructing the sample values of the current block based at least in part on the converted predicted sample values of the current block.

26. The method of any one of claims 23-25 further comprising, following the prediction:
converting the reconstructed sample values of the current block from the second format to the first format; and
storing the converted reconstructed sample values of the current block as part of the previously reconstructed content.

27. The method of any one of claims 22-26 wherein the prediction is intra-picture prediction, and wherein the set of sample values of the previously reconstructed content are part of the current picture.

28. The method of any one of claims 22-26 wherein the prediction is inter-picture prediction, and wherein the set of sample values of the previously reconstructed content are part of a reference picture.

29. The method of any one of claims 1-21 wherein the encoding or decoding includes prediction of sample values of a current block in a current picture based at least in part on a set of sample values of previously reconstructed content, and wherein the prediction includes evaluating whether the set of sample values of the previously reconstructed content and the sample values of the current block are in different formats.

30. The method of any one of claims 1-21 wherein the encoding or decoding includes deblocking previously reconstructed content according to one or more rules.

31. The method of claim 30 wherein the deblocking includes adjusting strength of a deblocking filter depending on whether primary components of the two adjacent blocks have non-zero residual values.

32. The method of claim 30 wherein the one or more rules account for different color spaces of two adjacent blocks within the previously reconstructed content, and wherein the deblocking includes adjusting strength of a deblocking filter depending on whether corresponding components of the two adjacent blocks have non-zero residual values.

33. A computing device adapted to perform the method of any one of claims 1-32.

34. One or more computer-readable media storing computer-executable instructions for causing a computing device programmed thereby to perform the method of any one of claims 1-32.