Claims

1. A decoder, the decoder comprising circuitry configured to:

receive, in a bitstream, a coded picture, the picture comprising

a first region, a second region, and a third region, wherein the first region is a first independently coded sub-picture, the second region is a second independently coded sub-picture and the third region is the remainder of the picture;

detect, in the bitstream, that the first region is encoded using block differential pulse code modulation;

detect, in the bitstream, that the second region is encoded using transform skip mode but not block differential pulse code modulation; and

detect, in the bitstream, that the third region is encoded using lossy encoding, wherein the lossy encoding includes at least one of inter-prediction or intra-prediction, discrete cosine transform of residual pixel values, and quantization of transform coefficients.

2. The decoder of claim 1, wherein the first region is an independently coded sub-picture.

3. The decoder of claim 1, wherein the second region is an independently coded sub-picture.

4. The decoder of claim 1, wherein the first region is a first independently coded sub-picture and the second region is a second independently coded sub-picture.

5. The decoder of claim 1, wherein:

the bitstream further includes a sub-picture header corresponding to the second region; and

the decoder is further configured to detect the indication that the second using transform skip residual coding is encoded using transform skip residual coding in the sub-picture header.

6. The decoder of claim 1, wherein the decoder is further configured to

decode the first region using a first processor thread; and

decode the second region using a second processor thread.

7. The decoder of claim 1, further configured to decode a current frame, wherein decoding the current frame further comprises decoding the first region using a decoding protocol corresponding to block differential pulse code modulation.

8. The decoder of claim 1, further configured to decode a current frame, wherein decoding the current frame further comprises decoding the third region using a decoding protocol corresponding to the lossy encoding protocol.

9. The decoder of claim 1 wherein the first region comprises a first plurality of coding units, the second region comprises a second plurality of coding units and the third region comprises the remainder of the picture.

10. The decoder of claim 1 wherein the first sub-picture includes a first group of one or more coding tree units, the second sub-picture includes a second group of one or more coding tree units and the remainder of the picture includes a third group of coding tree units.

11. A method of combined lossless and lossy decoding, the method comprising:

receiving, by a decoder comprising circuitry, in a bitstream, a coded picture, the picture comprising

a first region, a second region, and a third region, wherein the first region is a first independently coded sub-picture, the second region is a second independently coded sub-picture and the third region is the remainder of the picture;

detecting, by the decoder and in the bitstream, that the first region is encoded using block differential pulse code modulation;

detecting, by the decoder and in the bitstream, that the second region is encoded using transform skip mode but not block differential pulse code modulation; and

detecting, by the decoder and in the bitstream, that the third region is encoded using lossy encoding, wherein the lossy encoding includes at least one of inter-prediction or intra-prediction, discrete cosine transform of residual pixel values, and quantization of transform coefficients.

12. The method of claim 11, wherein the first region is an independently coded sub-picture.

13. The method of claim 11, wherein the second region is an independently coded sub-picture.

14. The method of claim 11, wherein the third region is an independently coded sub-picture.

15. The method of claim 11, wherein:

the bitstream further includes a sub-picture header corresponding to the second region: and

the decoder is further configured to detect the indication that the second using transform skip residual coding is encoded using transform skip residual coding in the sub-picture header.

16. The method of claim 11, further comprising:

decoding the first region using a first processor thread; and

decoding the third region element using a second processor thread.

17. The method of claim 11, further comprising decoding a current frame, wherein decoding the current frame further comprises decoding the first region using a decoding protocol corresponding to block differential pulse code modulation.

18. The decoder of claim 10 where the location of the first sub-picture in the picture is signaled in the bitstream and the location of the second sub-picture in the picture is signaled in the bitstream.

19. A decoder comprising circuitry configured to decode a coded picture received in a bitstream, the coded picture including:

a first region coded using block differential pulse code modulation (BDPCM),

a second region coded using transform skip mode but not BDPCM, and

a third region coded using lossy, wherein lossy coding includes at least one of inter-prediction or intra-prediction, transform of residual pixel values, and quantization of transform coefficients, wherein the first region is a first independently coded-sub-picture, the second region is a second independently coded sub-picture and the third region is the remainder of the picture.