

CLAIMS

What is claimed is:

1. A method of decoding comprising:
 - receiving an entropy coded bitstream comprising compressed video data including point cloud occupancy codes;
 - generating one or more dequantized dimensions of a boundary box of a point cloud by a process comprising:
 - parsing dimensions of the boundary box of the point cloud from the bitstream;
 - entropy-decoding the entropy coded dimensions of the boundary box of the point cloud; and
 - dequantizing the dimensions of the boundary box of the point cloud; determining whether the compressed video data was predicted by using an attribute-based predictor or a geometry-based predictor; based on determining that the compressed video data was predicted by using the attribute-based predictor, determining a predictor for decoding is the attribute-based predictor;
 - based on determining that the compressed video data was predicted by using the attribute-based predictor, determining the predictor for decoding is the geometry-based predictor; and
 - building an octree structure by subdividing the boundary box of the point cloud according to the dequantized dimensions of the boundary box including the occupancy codes of the point cloud by using the determined predictor.
2. The method of claim 1, further comprising:
 - selecting the attribute-based predictor or the geometry-based predictor based on a geometry position of points in a candidate list.

3. The method of claim 1, further comprising: determining whether the compressed video data was predicted by using the attribute-based predictor or the geometry-based predictor based on signaling in syntax of the bitstream.

4. The method of claim 1, further comprising: when an attribute of the occupancy codes is a scalar value, determining that the predictor for decoding is the geometry-based predictor.

5. The method of claim 1, wherein the predictor for decoding is binarized into a fixed-length code and individual bits are arithmetic code encoded with context modeling.

6. The method of claim 1, wherein the predictor for decoding is binarized into a truncate unary (TU) code with a maximum value set as the maximum value of the predictor for decoding.

7. The method of claim 1, wherein attributes of the point cloud include one or more of color or reflectance.

8. The method of claim 1, further comprising:
determining an average of a residual per chunk for each of the attribute-based predictor and the geometry-based predictor; and
determining whether to use the attribute-based predictor or the geometry-based predictor based on the determined averages of the residual.

9. The method of claim 1, further comprising:
when a residual or a converted residual is less than a truncated unary (TU) code maximum, using a TU code with a maximum value for the encoding; and
when the residual or the converted residual is not less than the TU code maximum, using an exponential code for the encoding.
10. The method of claim 9, wherein the exponential code is an Exponential Golomb code with order 0.
11. The method of claim 9, further comprising:
for bits in the TU code, using a context based arithmetic code; and
for bits in the exponential code, using bypass coding.
12. The method of claim 1, further comprising:
starting with the geometry-based predictor;
after a period of time, comparing a chunk of points with a threshold;
when the chunk of points is greater than the threshold, using the attribute-based predictor.
13. The method of claim 1, further comprising selecting a best prediction candidate based on a rate-distortion optimization method where the best prediction candidate leads to a minimal cost of rate and distortion function.
14. The method of claim 1, further comprising:

generating a displayable image based at least in part on the built octree structure;; and
performing control so that the displayable image is displayed by a display.

15. A computer system for decoding video data, the computer system comprising:
one or more computer-readable non-transitory storage media configured to store computer
program code; and

one or more computer processors configured to access said computer program code and
operate as instructed by said computer program code, said computer program code including:

receiving code configured to cause the one or more computer processors to
receive an entropy coded bitstream comprising compressed video data including point cloud
occupancy codes;

dequantization code configured to cause the one or more computer processors to
generate one or more dequantized dimensions of a boundary box of the point cloud by a
process comprising: parsing dimensions of the boundary box of the point cloud from the
bitstream, entropy-decoding the entropy coded dimensions of the boundary box of the
point cloud, and dequantizing the dimensions of the boundary box of the point cloud;

determining code configured to cause the one or more computer processors to
determine whether the compressed video data was predicted by using an attribute-based
predictor or a geometry-based predictor;

predictor selection code configured to cause the one or more computer processors
to:

based on determining that the compressed video data was predicted by using the attribute-based predictor, determine a predictor for decoding is the attribute-based predictor;

based on determining that the compressed video data was predicted by using the attribute-based predictor, determine the predictor for decoding is the geometry-based predictor; and

octree building code configured to cause the one or more computer processors to build an octree structure by subdividing the boundary box of the point cloud according to the dequantized dimensions of the boundary box including the occupancy codes of the point cloud by using the determined predictor.

16. The computer system of claim 15, wherein the predictor selection code is further configured to cause the one or more computer processors to:

determine whether the compressed video data was predicted by using the attribute-based predictor or the geometry-based predictor based on signaling in syntax of the bitstream.

17. The computer system of claim 15, further comprising:

a display, wherein the computer program code further comprises: display code configured to cause the at one or more processors to: generate a displayable image based at least in part on the built octree structure, and perform control so that the displayable image is displayed by the display.

18. The computer system of claim 15, wherein attributes of the point cloud include one or more of color or reflectance.

19. A non-transitory computer readable medium having stored thereon a computer program for decoding video data, the computer program configured to cause one or more computer processors to:

receive an entropy coded bitstream comprising compressed video data including point cloud occupancy codes;

generate one or more dequantized dimensions of a boundary box of a point cloud by a process comprising:

parsing dimensions of the boundary box of the point cloud from the bitstream;

entropy-decoding the entropy coded dimensions of the boundary box of the point cloud; and

dequantizing the dimensions of the boundary box of the point cloud;

determine whether the compressed video data was predicted by using an attribute-based predictor or a geometry-based predictor;

based on determining that the compressed video data was predicted by using the attribute-based predictor, determine a predictor for decoding is the attribute-based predictor;

based on determining that the compressed video data was predicted by using the attribute-based predictor, determine the predictor for decoding is the geometry-based predictor; and

build an octree structure by subdividing the boundary box of the point cloud according to the dequantized dimensions of the boundary box including the occupancy codes of the point cloud by using the determined predictor.

20. The non-transitory computer-readable storage medium of claim 19, wherein the computer program is configured to cause the one or more computer processors to:

- generate a displayable image based at least in part on the built octree structure; and
- perform control so that the displayable image is displayed by a display.