CLAIMS

1. A method of coding point cloud data, the method comprising: determining at least two reference points in a reference point cloud frame of the point cloud data; applying linear interpolation to the at least two reference points to derive a third reference point different than the at least two reference points, the third reference point comprising a radius inter predictor, the radius inter predictor indicative of a radius of at least one current point in a current point cloud frame of the point cloud data; and coding the current point cloud frame based on the radius inter predictor for the at least one current point in the current point cloud frame.

2. The method of claim 1, wherein the at least two reference points belong to a group of reference points within a range of at least one of azimuth angles, laser identifiers (IDs), or radiuses.

3. The method of claim 1, further comprising compensating the reference point cloud frame for motion by applying at least one of rotation, translation, or local motion.

4. The method of claim 1, further comprising at least one of quantizing, approximating, or scaling at least one of position coordinates of the at least two reference points or position coordinates of the at least one current point.

5. The method of claim 4, further comprising signaling or parsing a bit depth of at least one of the position coordinates of the at least two reference points or the position coordinates of the at least one current point.

6. The method of claim 4, further comprising constructing an array of or a map of the position coordinates of the at least two reference points to quantize the position coordinates of the at least two reference points.

7. The method of claim 1, wherein the at least two reference points have identical or adjacent laser identifiers (IDs), the method further comprising ordering the at least two reference points according to a respective azimuth angle associated with the at least two reference points.

8. The method of claim 7, wherein the at least two reference points have identical azimuth angles, the method further comprising further ordering the at least two reference points according to a respective radius associated with the at least two reference points.

9. The method of claim 1, wherein the at least two reference points have identical or adjacent azimuth angles, the method further comprising ordering the at least two reference points according to a respective laser identifier associated with the at least two reference points.

10. The method of claim 9, wherein the at least two reference points have identical laser identifiers, the method further comprising further ordering the at least two reference points according to a respective radius associated with the at least two reference points.

11. The method of claim 1, wherein a position of the at least two reference points is associated with a position of the at least one current point.

12. The method of claim 1, further comprising determining positions of the at least two reference points based on an azimuth angle and laser identifier of a first current point of the at least one current point.

13. The method of claim 12, wherein determining positions of the at least two reference points comprises: searching for a first nearest azimuth angle that is smaller than an azimuth angle of the first current point to determine a position of a first reference point of the at least two reference points; and searching for a second nearest azimuth angle that is greater than the azimuth angle of the first current point to determine a position of a second reference point of the at least two reference points.

14. The method of claim 12, wherein determining positions of the at least two reference points comprises: searching for a first nearest laser identifier (ID) that is smaller than a laser ID of the first current point to determine a position of a first reference point of the at least two reference points; and searching for a second nearest laser ID that is greater

than the laser ID of the first current point to determine a position of a second reference point of the at least two reference points.

15. The method of claim 1, further comprising determining positions of the at least two reference points based on a range of azimuth angles and laser identifiers (IDs).

16. The method of claim 15, wherein the range of azimuth angles and laser identifiers is based on a radius interpolation method to be applied to the at least two reference points.

17. The method of claim 1, wherein one or more reference points of the at least two reference points are unavailable or include a duplicate predictor, the method further comprising: replacing an unavailable predictor or a duplicate predictor with a default predictor or a reference point with a next nearest laser identifier or azimuth angle; or discarding the unavailable predictor or the duplicate predictor.

18. The method of claim 1, wherein the at least two reference points include identical laser identifiers or identical azimuth angles.

19. The method of claim 18, wherein the at least two reference points comprise more than two reference points, and wherein applying linear interpolation to the at least two reference points comprises applying a radius interpolation filter having more than two coefficients to the more than two reference points.

20. The method of claim 18, wherein the current point is one point of at least two current points, the method further comprising: grouping the at least two reference points into a first segment; grouping the at least two current points into a second segment; and generating a plurality of interpolated radius predictors based on the first segment for the second segment.

21. The method of claim 18, further comprising, prior to applying linear interpolation to the at least two reference points, determining that a difference between a radius value of a first reference point of the at least two reference points and a radius value of a second reference point of the at least two reference points is less than a threshold.

22. The method of claim 21, wherein the threshold is a first threshold, the method further comprising determining a type of interpolation to apply based on a comparison of the difference between the radius value of a first reference point and the radius value of a second reference point to the first threshold and to a second threshold.

23. The method of claim 18, further comprising at least one of a) signaling or parsing a syntax element indicative of an applied interpolation method or b) signaling or parsing a syntax element indicative of a coefficient or weight of interpolation.

24. The method of claim 1, further comprising determining a radius residual.

25. The method of claim 24, further comprising context coding the radius residual, wherein contexts for context coding the radius residual are separate from contexts for context coding a radius residual with intra prediction.

26. The method of claim 24, further comprising prior to determining a predicted radius, decoding an azimuth residual of the current point.

27. The method of claim 26, wherein an inverse quantization, inverse scaling, or representation bit depth is dependent on a decoded radius value of a previously reconstructed point or a radius value of a reference point of two or more reference points.

28. The method of claim 1, wherein determining the at least two reference points in the reference point cloud frame comprises determining the at least two reference points in the reference point cloud frame using a previously decoded point.

29. The method of claim 1, wherein determining the at least two reference points in the reference point cloud frame comprises determining the at least two reference points in the reference point cloud frame using a parent node, a grandparent node, or a great-grandparent node, of the at least one current point.

30. A device for coding point cloud data, the device comprising: memory configured to store the point cloud data; and one or more processors communicatively coupled to the

memory, the one or more processors being configured to: determine at least two reference points in a reference point cloud frame of the point cloud data; apply linear interpolation to the at least two reference points to derive a third reference point different than the at least two reference points, the third reference point comprising a radius inter predictor, the radius inter predictor indicative of a radius of at least one current point in a current point cloud frame of the point cloud data; and code the current point cloud frame based on the radius inter predictor for the at least one current point in the current point cloud frame.

31. The device of claim 30, wherein the device comprises a vehicle, a robot, an extended reality system, or a smartphone.

32. The device of claim 30, wherein the at least two reference points belong to a group of reference points within a range of at least one of azimuth angles, laser identifiers (IDs), or radiuses.

33. The device of claim 30, wherein the one or more processors are further configured to at least one of quantize, approximate, or scale at least one of position coordinates of the at least two reference points or position coordinates of the at least one current point.

34. The device of claim 30, wherein the at least two reference points have identical or adjacent laser identifiers (IDs), wherein the one or more processors are further configured to order the at least two reference points according to a respective azimuth angle associated with the at least two reference points.

35. The device of claim 30, wherein the at least two reference points have identical or adjacent azimuth angles, wherein the one or more processors are further configured to order the at least two reference points according to a respective laser identifier associated with the at least two reference points.

36. The device of claim 30, wherein the one or more processors are further configured to determine positions of the at least two reference points based on an azimuth angle and laser identifier of a first current point of the at least one current point.

37. The device of claim 30, wherein the one or more processors are further configured to determine positions of the at least two reference points based on a range of azimuth angles and laser identifiers.

38. The device of claim 30, wherein the one or more processors are further configured to compensate the reference point cloud frame for motion by applying at least one of rotation, translation, or local motion.

39. The device of claim 30, wherein the at least two reference points include identical laser identifiers or identical azimuth angles.

40. The device of claim 36, wherein to determine positions of the at least two reference points the one or more processors are further configured to: search for a first nearest azimuth angle that is smaller than an azimuth angle of the first current point to determine a position of a first reference point of the at least two reference points; and search for a second nearest azimuth angle that is greater than the azimuth angle of the first current point to determine a position of a second reference point of the at least two reference points.

41. A non-transitory computer-readable storage medium storing instructions, which, when executed, cause one or more processors to: determine at least two reference points in a reference point cloud frame of point cloud data; apply linear interpolation to the at least two reference points to derive a third reference point different than the at least two reference points, the third reference point comprising a radius inter predictor, the radius inter predictor indicative of a radius of at least one current point in a current point cloud frame of the point cloud data; and code the current point cloud frame based on the radius inter predictor for the at least one current point in the current point cloud frame.