

It is not intended to identify key or critical elements of the present principles. The following summary merely presents some aspects of the present principles in a simplified form as a prelude to the more detailed description provided below.

Disclosed herein is a method comprising encoding a projection mode associated with an image region of a first depth image, said projection mode indicating if said image region stores either the minimum or the maximum depth value of at least one orthogonally projected 3D point of the point cloud along a same projection direction; and encoding said depth minimum and maximum depth values as a function of said projection mode.

In the above disclosure, encoding said depth minimum and maximum depth values as function of said projection mode comprises encoding the minimum depth values as first image data and encoding an information representative of the maximum depth values as second image data when the projection mode equals a first value, and encoding the maximum depth values as first image data and encoding an information representative of the minimum depth values as second image data when the projection mode equals a second value.

In the above disclosure, the information representative of either the minimum or maximum depth values is the absolute difference between the maximum and minimum depth values.

In the above disclosure, the method further comprises transmitting said encoded image region and signaling said projection mode.

In the above disclosure, the projection mode is signaled at the point cloud level to indicate if said projection mode may change or not.

In the above disclosure, the projection mode is signaled at the patch level if said projection mode is signaled at the point cloud level as changing.

Disclosed herein is a method comprising obtaining a projection mode indicating if an image region of a first depth image stores either the minimum or the maximum depth value of at least one orthogonally projected 3D point of the point cloud along a same projection direction; and decoding said depth minimum and maximum depth values as a function of said projection mode.

In the above disclosure, decoding said depth minimum and maximum depth values as a function of said projection mode comprises decoding the minimum depth values as first image data and decoding an information representative of the maximum depth values as second image data when the projection mode equals a first value, and decoding the maximum depth values as first image data and decoding an information representative of the minimum depth values as second image data when the projection mode equals a second value.

In the above disclosure, the information representative of either the minimum or maximum depth values is the absolute difference between the maximum and minimum depth values.

In the above disclosure, the projection mode from a bitstream.

According to a first aspect, there is provided a method including: decoding a first depth value from first image data, and an information representative of a second depth value from second image data, reconstructing a first 3D point of a point cloud using the first depth value, reconstructing a second 3D point of the point cloud using the information representative of the second depth value and a projection mode, the first 3D point and the second 3D point being orthogonally projected onto a same point of a projection plane, the projection mode indicating if a position of the first 3D point along a projection axis is either lower or higher than a position of the second 3D point along the projection axis.

According to a second aspect, there is provided a device including at least one processor configured to: decoding a first depth value from first image data, and an information representative of a second depth value from second image data, reconstructing a first 3D point of a point cloud using the first depth value, reconstructing a second 3D point of the point cloud using the information representative of the second depth value and a projection mode, the first 3D point and the second 3D point being orthogonally projected onto a same point of a projection plane, the projection mode indicating if a position of the first 3D point along a projection axis is either lower or higher than the 3D position of the second 3D point along the projection axis.

According to a third aspect, there is provided a method including: encoding a projection mode indicating if a position along a projection axis of a first 3D point of a point cloud is either lower or higher than a position along the projection axis of a second 3D point of the point cloud, the first 3D point and the second 3D point being orthogonally projected onto a same point of a projection plane, encoding a depth value of said first 3D point as first image data and encoding an information representative of a depth value of said second 3D point as second image data.

According to a fourth aspect, there is provided a device including at least one processor configured to: encoding a projection mode indicating if a position along a projection axis of a first 3D point of a point cloud is either lower or higher than a position along the projection axis of a second 3D point of the point cloud, the first 3D point and the second 3D point being orthogonally projected onto a same point of a projection plane, encoding a depth value of said first 3D point as first image data and encoding an information representative of a depth value of said second 3D point as second image data.

According to a fifth aspect, there is provided a computer program product including instructions which, when the program is executed by one or more processors, causes the one or more processors to carry out the method according to the above aspects.

According to a sixth aspect, there is provided a non-transitory computer-readable medium including instructions for causing one or more processors to perform the steps of the method according to the above aspects.

According to a seventh aspect, there is provided a signal comprising data representative of a projection mode indicating if a position along a projection axis of a first 3D point of a point cloud is either lower or higher than a position along the projection axis of a second 3D point of the point cloud, the first 3D point and the second 3D point being orthogonally projected onto a same point of a projection plane, and first image data comprising a depth value of said first 3D point and second image data comprising an information representative of a depth value of said second 3D point.

The specific nature of the present principles as well as other aspects, advantages, features and uses of the present principles will become evident from the following description of examples taken in conjunction with the accompanying drawings.

1. Brief Description of Drawings.

In the drawings, examples of several embodiments are illustrated. The drawings show:

- **Fig. 1** illustrates a schematic block diagram of an example of an image-based point cloud encoding structure;
- **Fig. 2** illustrates the geometry compression part of the encoder of **Fig. 1**;