

depth values along projection lines, one is added to all delta_depth values to be coded;

- if the occupancy information is embedded into DepthImg1, when DepthImg1 stores the maximum depth values along projection lines, the depth patch generation step is modified to make sure that all depth values, and more particularly depth D1, to be coded are larger than 0.

According to a first aspect of the present disclosure, there is provided a method including: obtaining an occupancy information indicating if blocks of a 2D regular grid defined over a projection plane are associated with depth information of an orthogonal projection of at least one point of a point cloud onto said projection plane; embedding said occupancy information in an image storing said depth information; and encoding said image.

According to a second aspect of the present disclosure, there is provided a device including means for: obtaining an occupancy information indicating if blocks of a 2D regular grid defined over a projection plane are associated with depth information resulting of an orthogonal projection of at least one point of a point cloud onto said projection plane; embedding said occupancy information in an image storing said depth information; and encoding said image.

Advantageously, embedding said occupancy information in an image storing said depth information comprises shifting the depth information to be stored.

According to an embodiment, the method further comprises transmitting information to indicate that the depth information has been shifted.

According to an embodiment, said image storing depth information of points of the point cloud having the smallest distances from the projection plane.

According to an embodiment, said image storing depth information of points of the point cloud having the largest distances from the projection plane.

According to an embodiment, said image storing depth information representative of the difference between depth information of points of the point cloud having the largest distances from the projection plane and depth information of points of the point cloud having the smallest distances from the projection plane.

According to a third aspect of the present disclosure, there is provided a method including: decoding an image storing depth information of an orthogonal projection of at least one point of a point cloud onto a projection plane; deriving an occupancy

information from the decoded image, said occupancy information indicating if blocks of a 2D regular grid defined over said projection plane are associated with said decoded depth information.

According to a fourth aspect of the present disclosure, there is provided a device including means for: decoding an image storing depth information of an orthogonal projection of at least one point of a point cloud onto a projection plane; and deriving and occupancy information from the decoded image, said occupancy information indicating if blocks of a 2D regular grid defined over said projection plane are associated with said decoded depth information.

According to a fifth aspect of the present disclosure, there is provided a signal carrying a bitstream including depth information of an orthogonal projection of at least one point of a point cloud onto a projection plane, said depth information embedding an occupancy information indicating if blocks of a 2D regular grid defined over said projection plane are associated with said depth information.

The encoder/decoder modules are advantageously implemented by one or more processors within the encoder/decoder.

The methods according to embodiments of the present disclosure may be implemented in software on a programmable apparatus. They may be implemented solely in hardware or in software, or in a combination thereof.

Since the present disclosure can be implemented in software, embodiments of the present disclosure can be embodied as computer readable code for provision to a programmable apparatus on any suitable carrier medium. A carrier medium may comprise a storage medium such as a floppy disk, a CD-ROM, a hard disk drive, a magnetic tape device or a solid state memory device and the like.

Embodiments of the present disclosure thus provide a computer-readable program comprising computer-executable instructions to enable a computer to perform the encoding/decoding method according to embodiments of the present disclosure.

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

According to a seventh aspect of the present disclosure, there is provided a non-transitory computer-readable medium including depth information of an

orthogonal projection of at least one point of a point cloud onto a projection plane, said depth information embedding an occupancy information indicating if blocks of a 2D regular grid defined over said projection plane are associated with said depth information.

1. Brief Description of Drawings.

In the drawings, examples of the present principles are illustrated. It shows:

- **Fig. 1** already described shows an encoder;
- **Fig. 2** already described illustrates the depth patch creation process of the encoder of Fig.1;
- **Fig. 3** already described illustrates the image generation process of the encoder of Fig.1;
- **Fig. 4** already described shows examples of sub-blocks traversals used in the encoder of Fig.1;
- **Fig. 5** already described shows a decoder;
- **Fig. 6** already described illustrates the image reconstruction process of the decoder of Fig.5;
- **Fig. 7** shows a lossless encoder in which the present principles may be advantageously implemented;
- **Fig. 8** shows modifications of the lossless encoder of Figure 7 according to an embodiment of the present disclosure;
- **Fig. 9** shows modifications of the decoder of Figure 5 according to an embodiment of the present disclosure;
- **Fig. 10** illustrates the geometry compression block modified according to a first embodiment of the present disclosure;
- **Fig. 11** illustrates the geometry compression block modified according to a second embodiment of the present disclosure;
- **Fig. 12** illustrates the geometry compression block modified according to a third embodiment of the present disclosure;
- **Fig. 13** illustrates an example of enhanced-delta-depth (EDD) codes according to an embodiment of the present disclosure;