Though both of them slightly slow down the entire algorithm, the reconstruction is still in real-time. Table 1 provides a comparison of running speeds using different operators; here we show the data of relative speed, as the absolute speed depends on the performance of GPU and on the operation method of depth sensor during data capturing. Figure 6 provides more results of 3D reconstruction using the proposed algorithm.

Fig. 4 Comparison of experimental results. Left: the original result of Kinect Fusion. Middle: the enhancement based on the Sobel operator. Right: an enlarged part at mouth of the middle image.

Fig. 5 Comparison of experimental results. Left: the original result of Kinect Fusion. Middle: the enhancement based on the Laplacian and minifying the size of volume, Right: an enlarged part at eye of the middle image.

Fig. 6 More 3D reconstruction results using the proposed algorithm.

TABLE 1 The Relative Running Speed of Different Depth Enhancment Methods.

Filter module	Non	Sobel operator	Laplacian operator
Relative speed	100%	95.4%	97.3%

VI . Conclusion

We implement a high - definition 3D reconstruction algorithm based on the base-line algorithm of Kinect Fusion. We add a depth enhancement module in the depth fusion step. Compared with the non-enhanced results, the details of 3D models are improved. In the future we shall apply some special filters designed for depth maps to improve the definition further.

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