7
Conclusion and Future works

This work described a method for rendering virtual views of a scene in real-time, using a collection of depth images and cameras calibration data as input. We proposed modifications to existing techniques so as to speed up the rendering process, which was accomplished with the usage of the computer graphics hardware.

Even though the generated images using our method present an acceptable level of realism, they contain some artifacts especially at objects' borders, which are coincident with areas of discontinuities in the input depth images. Improving the proposed method for identification of discontinuities in depth or alternatives to the proposed compositing scheme could alleviate that deficiency. Related works apply matting to avoid artifacts and cracking on objects' borders, but in an offline stage. A real-time alternative would be preferable, so it deserves further investigation.

Another limitation of our work is that seams appear when blending color-flat areas captured with cameras that have not been color-calibrated. Related works do not mention how to deal with this problem, but apparently some pre- or post-processing is done to account for the problem. A more desirable approach would be to modify the proposed method to work out those seams.

Overall, the application developed for this work can be effectively used to manipulate the virtual viewpoint and to evaluate the rendering resulting quality in real-time, even for full HD images. It can be further improved to integrate new rendering methods or new means of interaction.

We plan to continue this work in four directions. First, deal with the weaknesses of the proposed blending method, by using gradient-domain compositing so as to avoid artifacts due to gain differences in cameras. Second, develop a robust and real-time module for estimating the dense depth maps for each input image. Third, extend this framework to work with videos, but taking spatio-temporal coherence into account both in the geometry estimation and in the rendering method. Finally, we look forward to build a real-time framework integrating these ideas, capable of rendering high-quality videos with free viewpoint at interactive rates.