

Event-Based Multi-Range Radiance Separation and 3D Reconstruction via Line-Scan Pseudo-Square Illumination

Supplementary Material

6. Additional Results of Radiance Separation and Depth Estimation on Real Scenes

Figure 13 shows our radiance separation results of the monochrome setting. Three examples, “Carved bone,” “Building blocks,” and “Onigiri” are already shown in the main paper, but more enlarged images are provided here. Three additional examples “Soft toy,” “Sandy-beach-like object,” and “Shower puff” are newly provided. Appearance, estimated 2D depth map, and 3D visualization of the estimated depth of each scene are shown in Figure 11.

As a result of the “Soft toy” example, internal scatterings of the objects can be seen in 1- to 7-global images, and the interreflections of the scene can be seen in 15- and 21-global images. In the “Sandy-beach-like object” example, different intensity distributions are observed in each separated image depending on the material; interreflection makes the pebbles bright in 1- and 3- global images, and the frosted glasses are bright in 3- and farther global images due to subsurface scattering. Regarding the “Shower puff” example, direct component images reflect surface textures and surface specular reflections, while all the global images presents interreflection and scattering inside it.

Figure 14 shows our radiance separation results of the RGB setting. Three examples, “Anmitsu,” “Flowers in a glass bowl,” and “Pink flower” are already shown in the main paper, but more enlarged images are provided here. Three additional examples “Origami flower,” “Plant and flowers,” and “Yellow flower” are newly provided. Appearance, estimated 2D depth map, and 3D visualization of the estimated depth of each scene are shown in Figure 12.

Regarding the “Origami flower” example, structure-dependent differences in color distribution within the same flower are visualized by the separation of interreflected light. As for the “Plant and flowers” example, reflections on the surface of the wooden basket appear in direct image and interreflections in the intricate grass appear in long-range global. In the “Yellow-flower” example, the yellow color components of the flower can be dominantly seen in the direct image, and the global images reveal the flower’s internal color.

All results of the separated r -global components and the estimated depth maps on each example are available in the supplementary video.

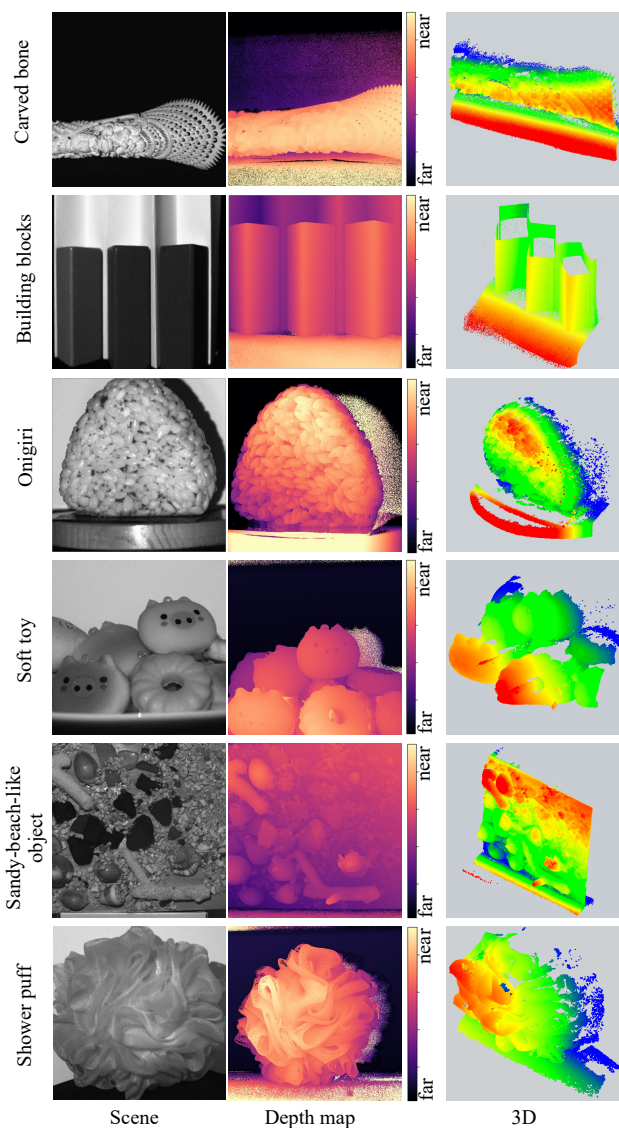


Figure 11. Appearance, estimated 2D depth map, and 3D visualization of estimated depth of scenes corresponding to Figure 13.

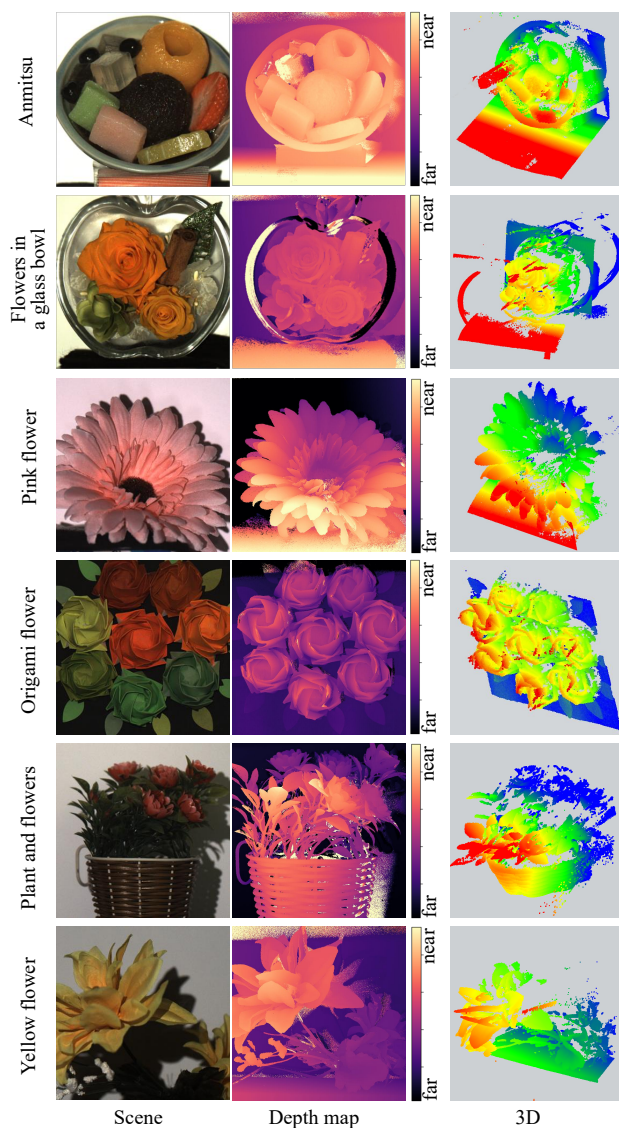


Figure 12. Appearance, estimated 2D depth map, and 3D visualization of estimated depth of scenes corresponding to Figure 14.

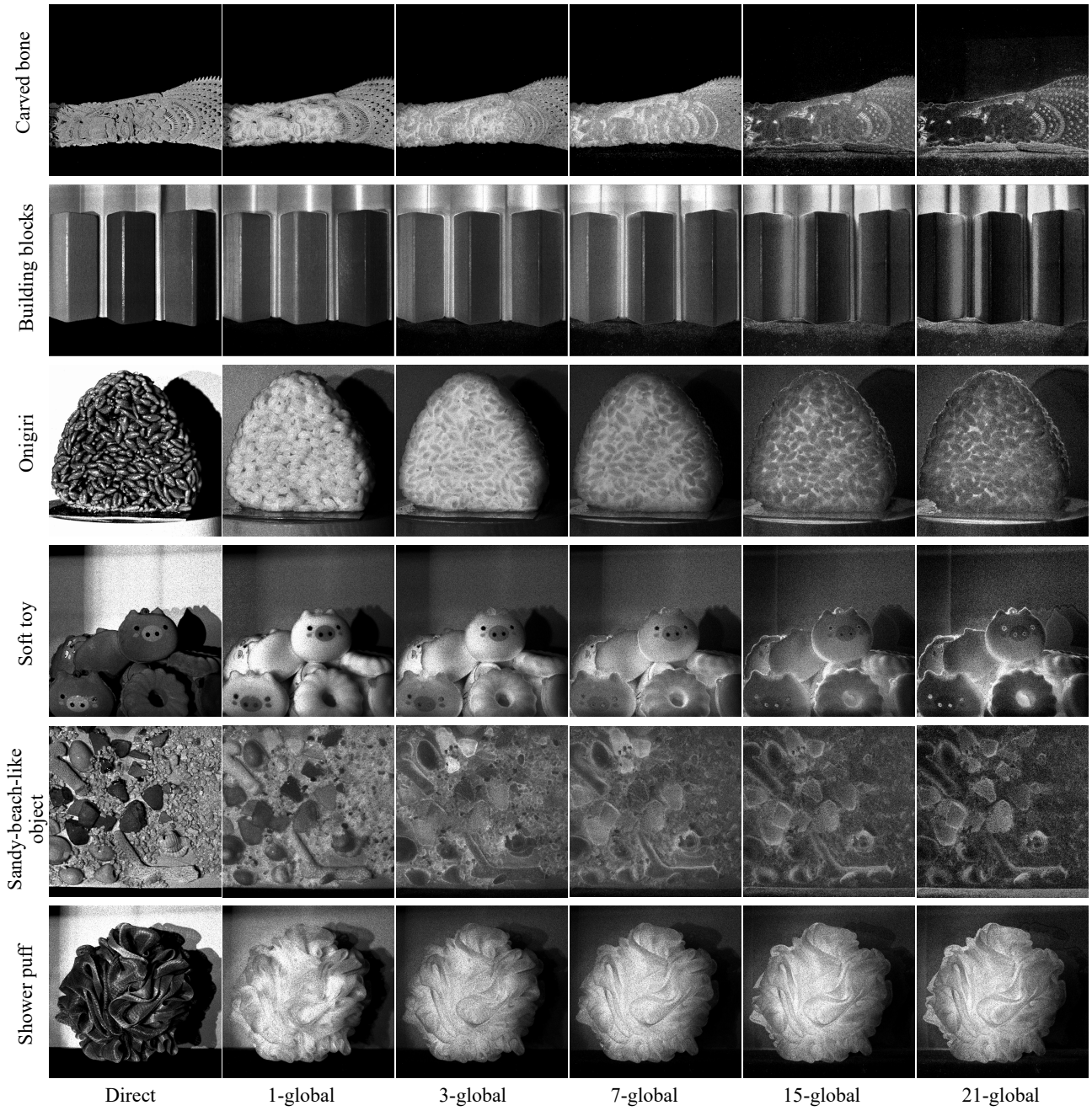


Figure 13. Radiance separation results of monochrome setting on real scenes. For each scene, the direct component and multiple r -global components are reconstructed from event-camera data. Note that the brightness of each component has been adjusted for visualization.

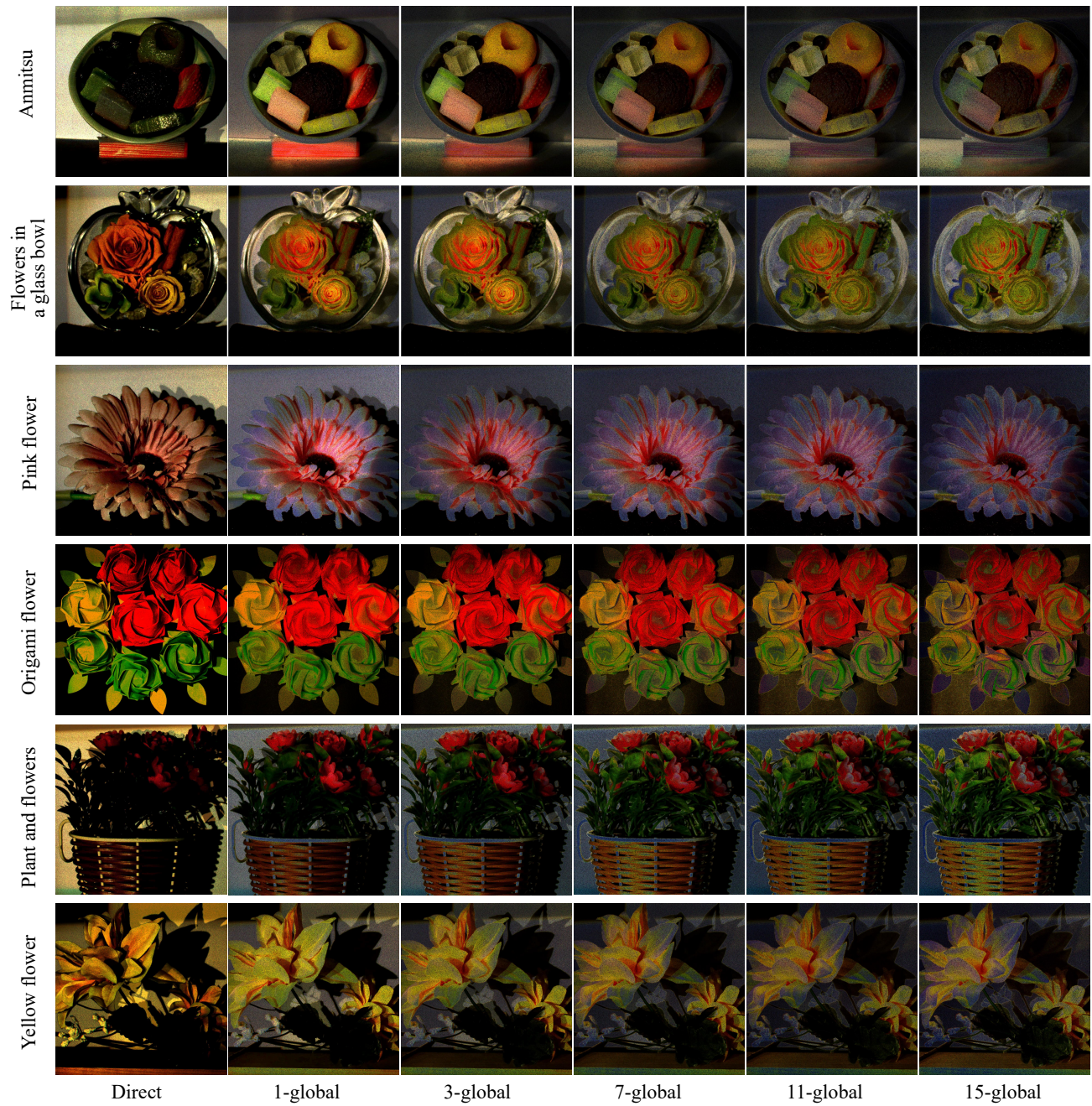


Figure 14. Radiance separation results of RGB setting on real scenes. For each scene, the direct component and multiple r -global components are reconstructed from event-camera data. Note that the brightness of each component has been adjusted for visualization.