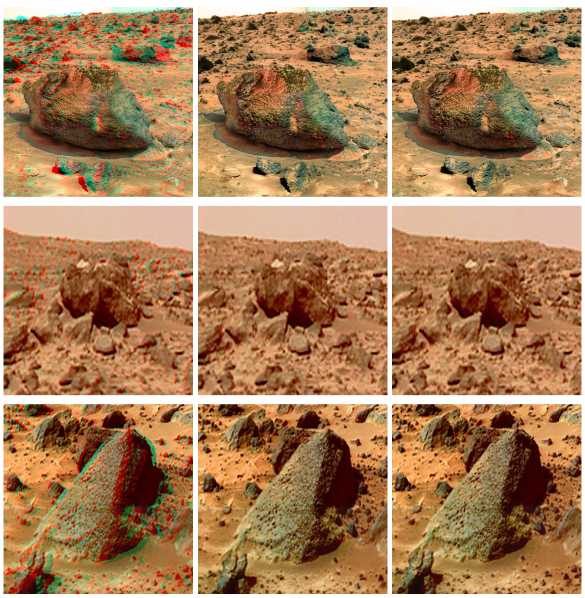
Recovering Stereo Pairs from Anaglyphs - Supplementary material

Anonymous CVPR submission

Paper ID 839



Original Left Right

Figure 1. Examples of images from Mars.

1. Additional images obtained online

Images captured on Mars. Figure 1 shows the results on anaglyph generated from images captured on Mars, which we obtained online. The good results for these anaglyphs are facilitated by the high amount of texture.

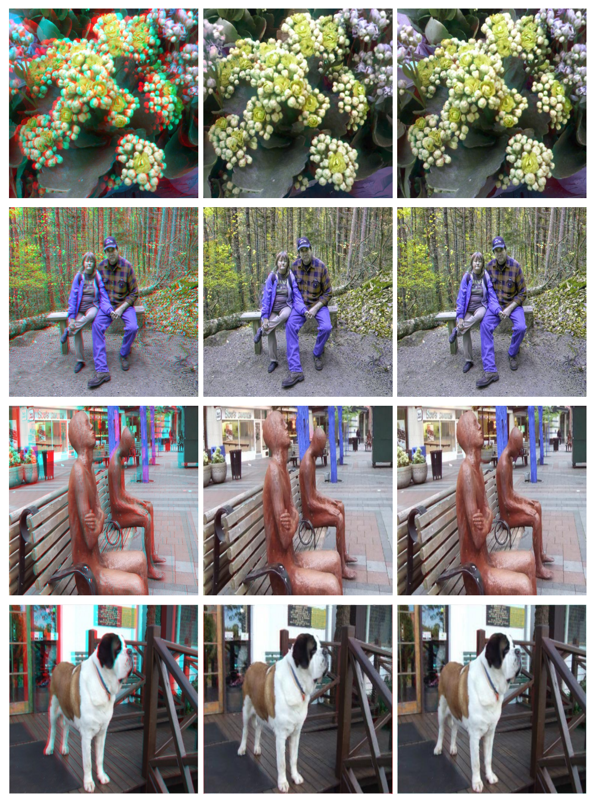
Images from the web. We show more examples of images obtained online in Figure 2.

2. Representative database images

Figures 3 and 4 show several representative images from our database of stereo images captured at two cities. They were captured indoors and outdoors. Here, since we have the original stereo pairs, we synthetically generate the anaglyph and apply our algorithm to reproduce the stereo pairs. These two figures show the original and generated images side by side.

3. Recolorization of incompatible colors

Another result of handling incompatible colors is shown in Figure 5.



Original Left Right

Figure 6. Examples of optimized anaglyph.

4. Optimized anaglyphs

The various versions of anaglyphs are listed in the http://en.wikipedia.org/wiki/Anaglyph_3D. One particular popular version is the *optimized anaglyph*.

For anaglyphs with cyan-red separation, the blue and green channels of the anaglyph image (I_G) are obtained by copying the blue and green channels from the right image

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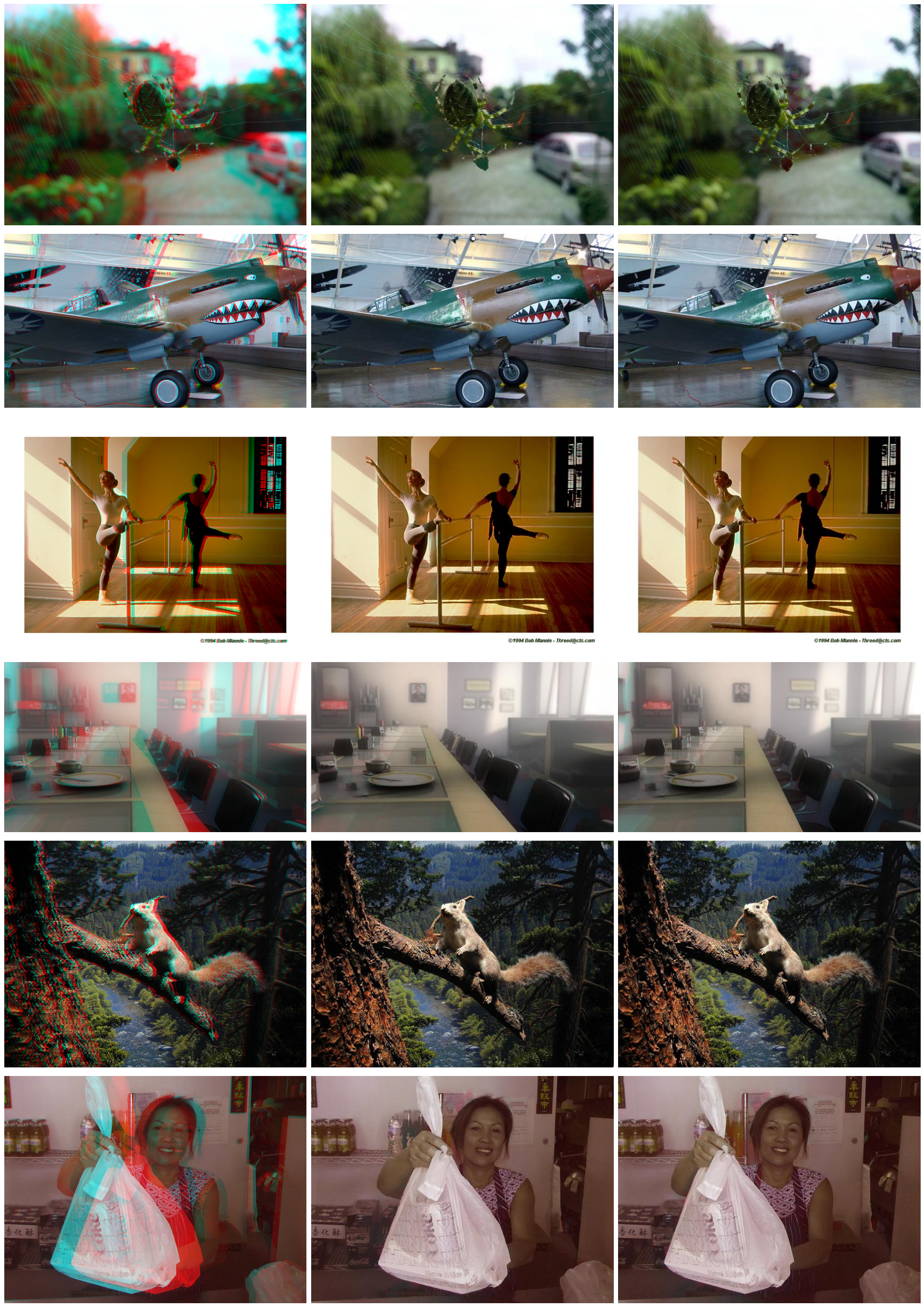


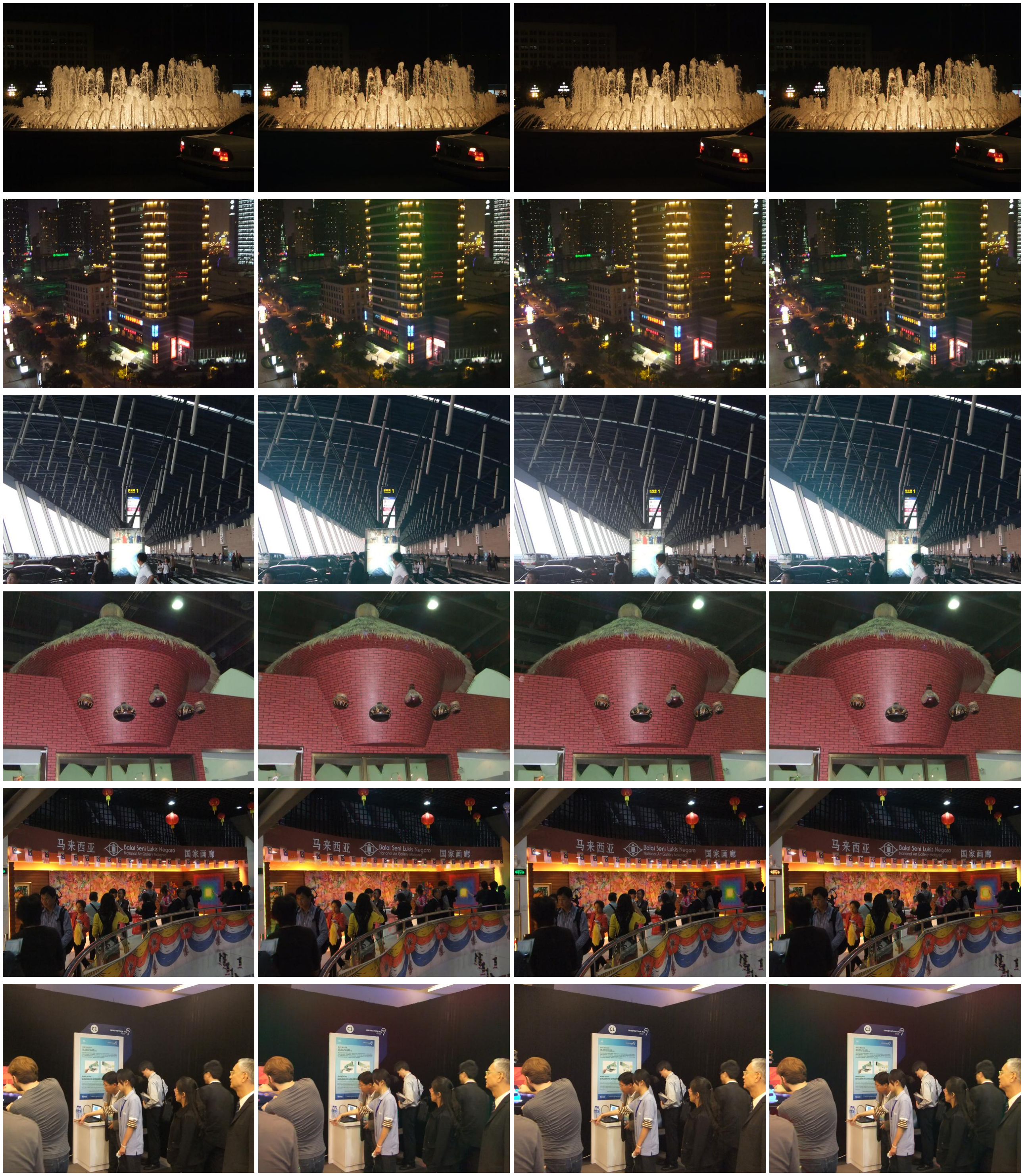
Original Left Right

Figure 2. Examples obtained online. Here we do not have the ground truth stereo pairs.

(I_R). There are variances in how the red channel of I_G is created from the left image (I_L). In general, we have:

$$I_G = \begin{bmatrix} a & b & c \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} I_L + \begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} I_R,$$

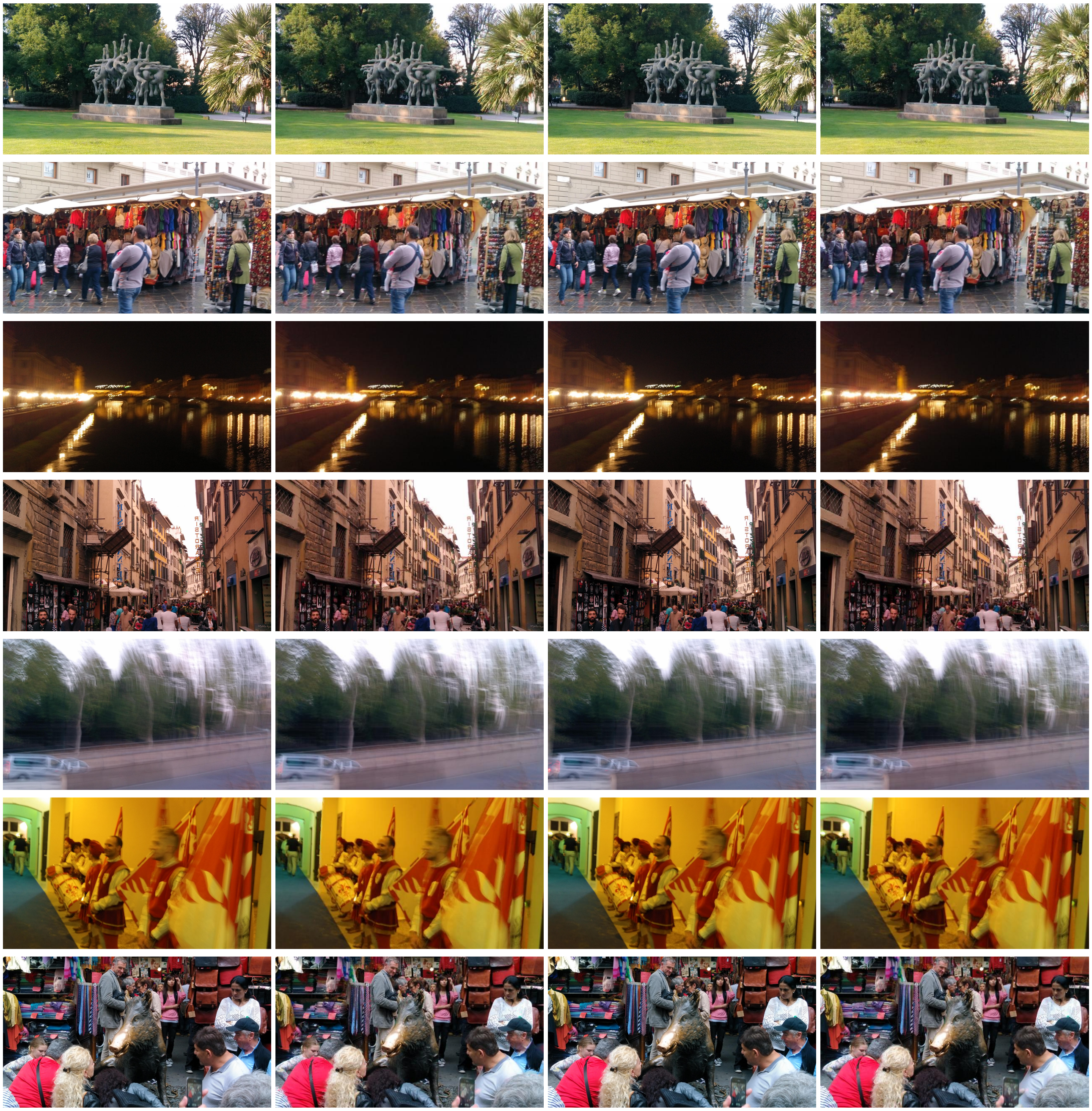
where a, b and c are three positive constants depending on the type of anaglyphs. Optimized anaglyphs are produced by taking $a = 0$, $b = 0.7$ and $c = 0.3$. This type of anaglyphs is popular because it decreases retina rivalry, which is a type of visual discomfort caused by the different intensities of the color channels. However, *the disadvantage is the information on the red channel is lost and cannot be recovered*. Figure 6 shows examples of our algorithm for



Ground truth, left | Ours, left | Ground truth, right | Ours, right

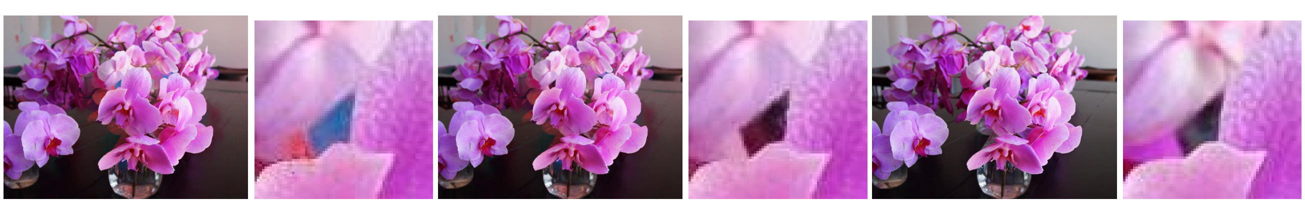
Figure 3. Examples from our database (CityA). We use the ground truth stereo pairs to synthetically generate the anaglyphs, which are used as inputs to our algorithm. Here we show the original and generated views.

optimized anaglyphs.



Ground truth, left | Ours, left | Ground truth, right | Ours, right

Figure 4. Examples from our database (CityB). We use the ground truth stereo pairs to synthetically generate the anaglyphs, which are used as inputs to our algorithm. Here we show the original and generated views.



Before | After | Ground truth

Figure 5. Example of recolorization of occluded regions with incompatible colors.

5. More comparison with Bando et al. [1]

Figure 7 shows two more comparisons with Bando et al. [1]. We thank one of the authors of [1] for sharing their code and images. Note that the disparity range of their input images tend to be small; both our technique and theirs work well in reconstructing the reference color image.

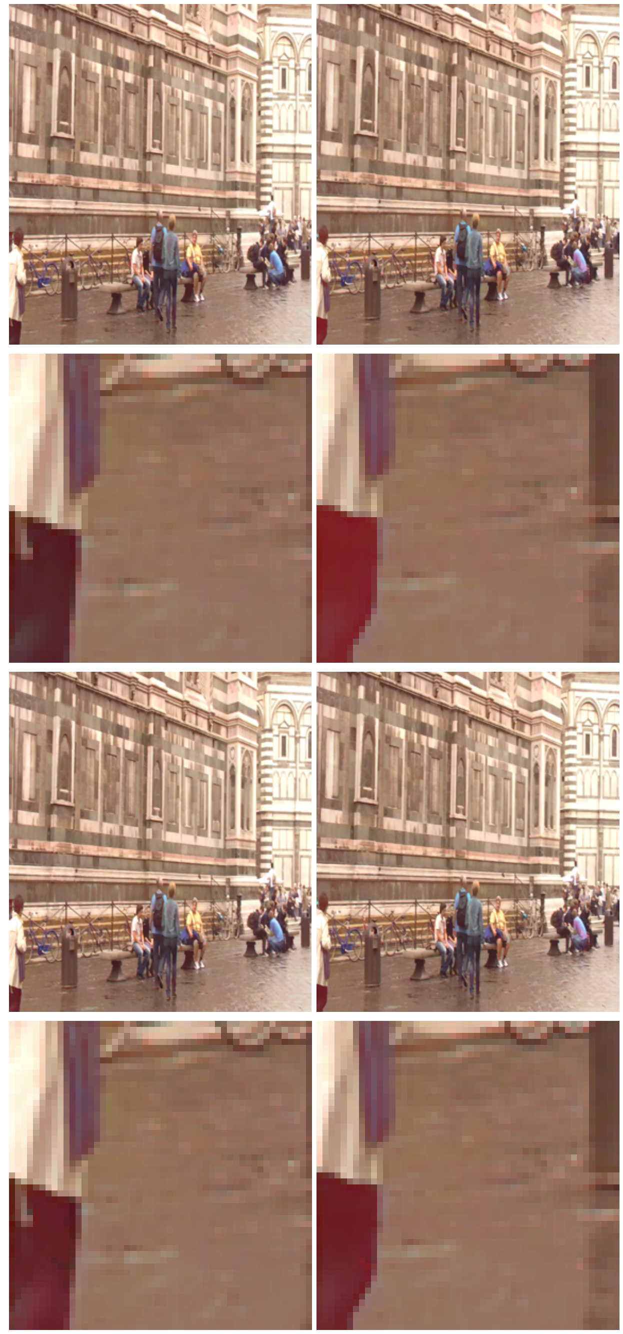


Figure 8. Another example for a video clip. First two rows: results obtained by processing each frame independently. Last two rows: results obtained by using temporal optical flow. Notice the color of the pants in the close-ups of the first frame.

6. Another video example

Figure 8 shows another example from a different video. The differences, while subtle, show more temporal color coherence.

Input [1] MSF+Col Ours (final)

Figure 7. Comparison with Bando et al. [1] on images taken with their camera.

References

[1] Y. Bando, B. Chen, and T. Nishita. Extracting depth and matte using a color-filtered aperture. *ACM Transactions on Graphics*, 27(5):134, 2008. 5, 6