

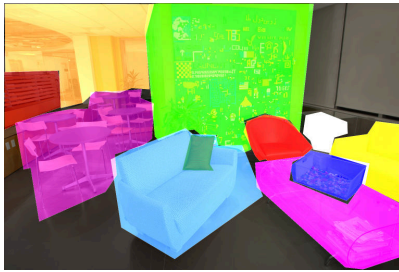
Supplemental Material for *User-assisted Image Compositing for Photographic Lighting*

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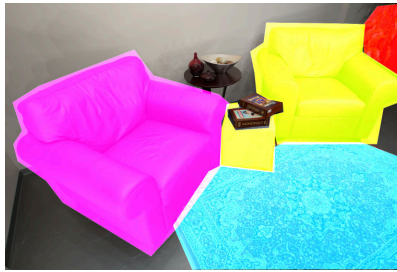
Sylvain Paris
Adobe

Kavita Bala
Cornell University

1 Regions



(a) Cafe regions



(b) Sofas regions



(c) Library regions

Figure 1: Users can provide crude segmentation of objects of interest in the scene, where the lighting can be controlled independently (alpha is changed for visualization purposes only). Then, we pre-compute our set of basis lights for the given segments, as part of an offline process. Finally, we provide an interface where users can interactively mix combination of the basis lights with our modifiers to produce variety of looks.

2 User evaluation



(a) User 1, our system, 5 min



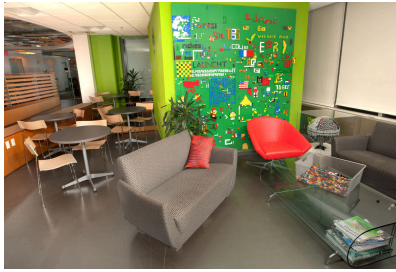
(b) User 2, our system, 4 min



(c) User 3, our system, 5 min



(d) User 4, our system, 5 min



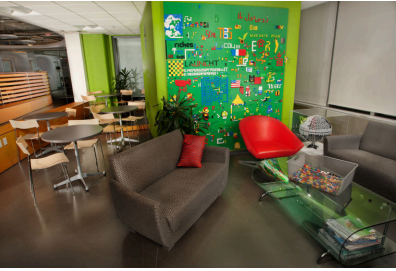
(e) User 5, our system, 4 min



(f) User 6, our system, 5 min



(g) User 7, our system, 5 min



(h) Professional, Photoshop, using our basis lights, 30 min



(i) Professional, Photoshop, using the full image stack, 45 min

Figure 2: We gave the Cafe scene to 7 novice users, and they were able to explore variety of looks. They were instructed to use our system for 5 minutes in an open-ended manner. We also showed them the results by a professional user, using the full power of Photoshop, with and without using our basis lights (as Photoshop layers). Note that we did not ask our users to match the Photoshop results, but just to consider them as examples of a good lighting design. Our users were able to explore variety of looks and produce different solutions, having features close in look and feel to the professionals. Notice that professionals make use of non-linear curves and local adjustments, which are beyond the scope of our system.



(a) User 1 using Photoshop for 8m



(b) User 2 using Photoshop for 5m



(c) User 1 using our system for 8m



(d) User 2 using our system for 5m

Figure 3: Two novice users were first given up to 10 minutes to explore various lighting designs, using our interactive system. Then, we asked them to work on the full image stack, using Photoshop. They were instructed to look for similar features. Our evaluation suggests that browsing through the set of unorganized layers and looking for good features to mask and blend is a cumbersome task for novice users. For comparison, while the users have spent the first 3-4 minutes browsing the full image stack in Photoshop, given the same amount of time, they have already explored a variety of solutions, using our lighting design system.



(a) User 1, our system, 15 min



(b) User 2, our system, 10 min



(c) User 3, our system, 16 min



(d) User 4, our system, 11 min



(e) User 5, our system, 12 min



(f) User 6, our system, 15 min



(g) User 7, our system, 16 min



(h) Professional, Photoshop, using our basis lights, 20 min



(i) Professional, Photoshop, using the full image stack, 45 min

Figure 4: We gave the library scene to 7 novice users, and they were able to explore variety of looks. We also gave this scene to a professional, with and without using our basis lights, given to him as Photoshop layers. He responded that our basis lights have captured useful lighting effects, and have roughly doubled the efficiency of his workflow. In this evaluation, users were shown the professional results, as an example of good lighting. However, this was not a pixel-to-pixel matching task, and they were free to come up with any solution they like. Notice that our system has allowed novice users to produce effects that have close look and feel to the professional design.



(a) User 3, our system, 16 min



(b) User 3, using Photoshop on the full image stack, 16 min

Figure 5: We show results of the same user given 16 minutes in our system, and then 16 minutes with Photoshop. We instructed the user to look for similar features, as the one he was able to produce using our system.

3 Dependency on the input images (carefully selected)

We show the set of 5 and 15 carefully selected images, used to generate the results in Figure 11 in the main paper.

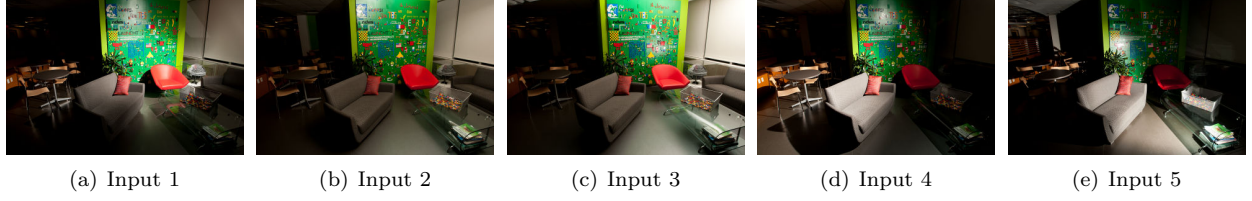


Figure 6: **Test 1: The 5 carefully selected images, used to generate the results in the paper.**

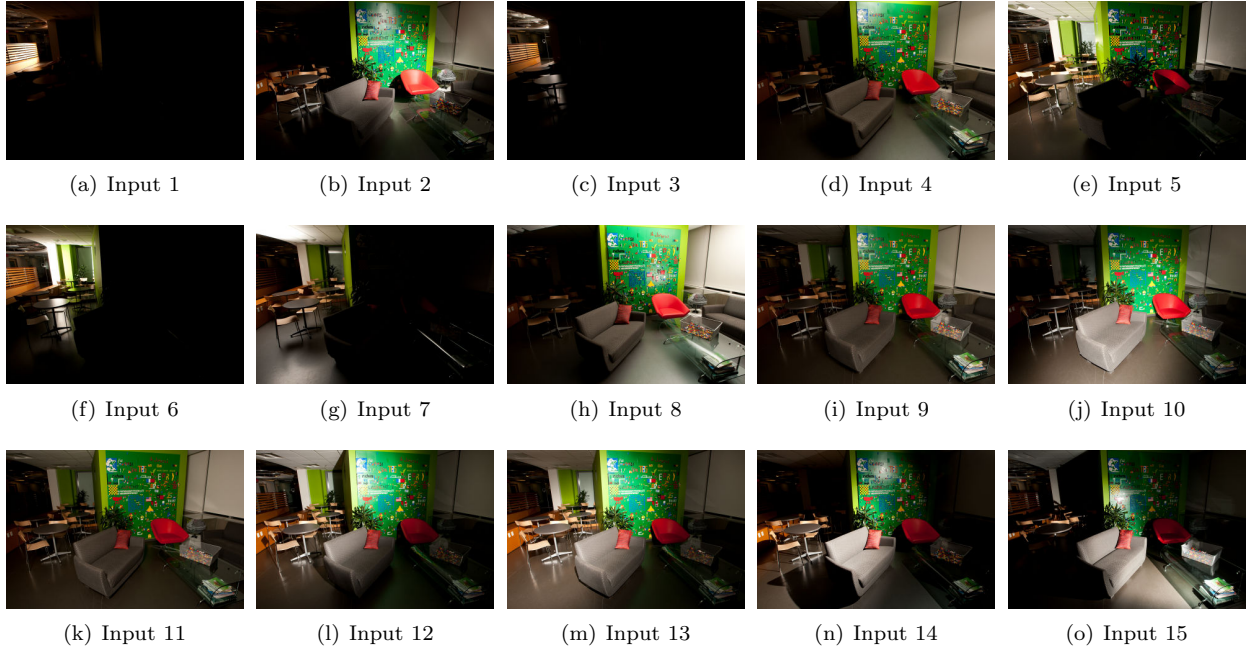


Figure 7: **Test 2: The 15 carefully selected images, used to generate the results in the paper.**

4 Dependency on the input images (randomly selected)

We show more variety of results using 5 and 15 randomly selected images. Based on those experiments, our conclusion is that 5 or 15 (randomly selected) images are not enough to capture all useful illumination effects around different parts of large scale scenes.

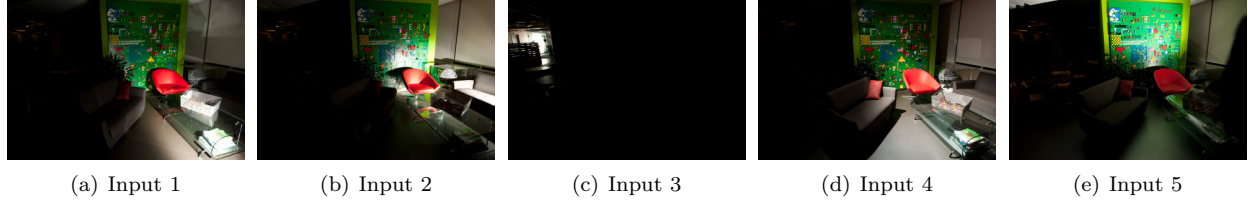


Figure 8: **Test 1: Random selection of 5 images.**

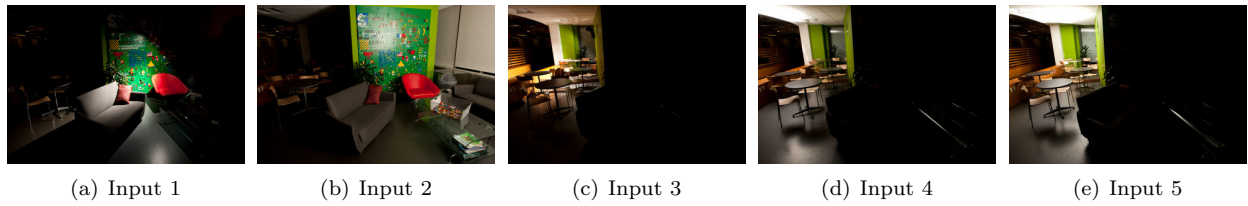


Figure 9: **Test 2: Random selection of 5 images.**

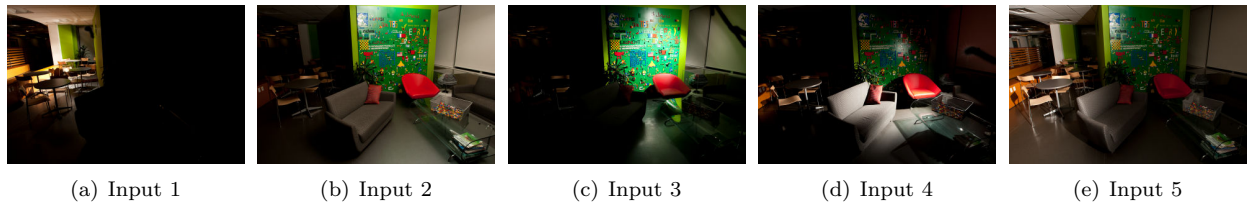


Figure 10: **Test 3: Random selection of 5 images.**

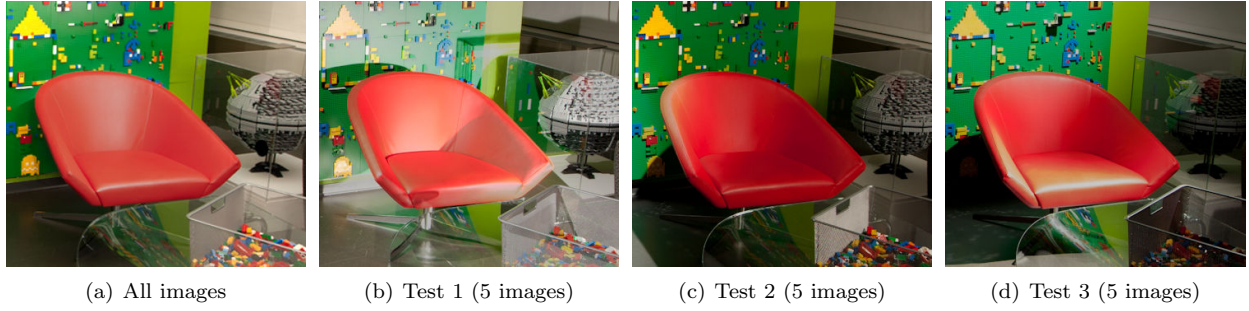


Figure 11: Our **edge light** optimized for the **red chair** object.

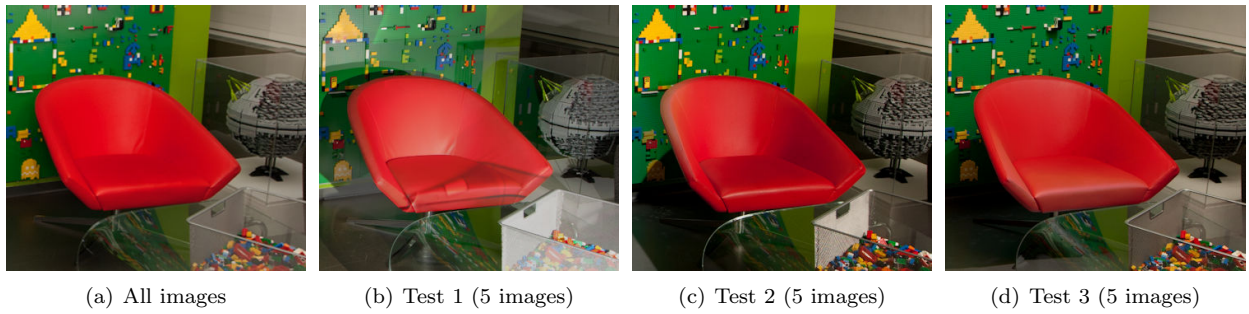


Figure 12: Our **diffuse light** optimized for the **red chair** object.

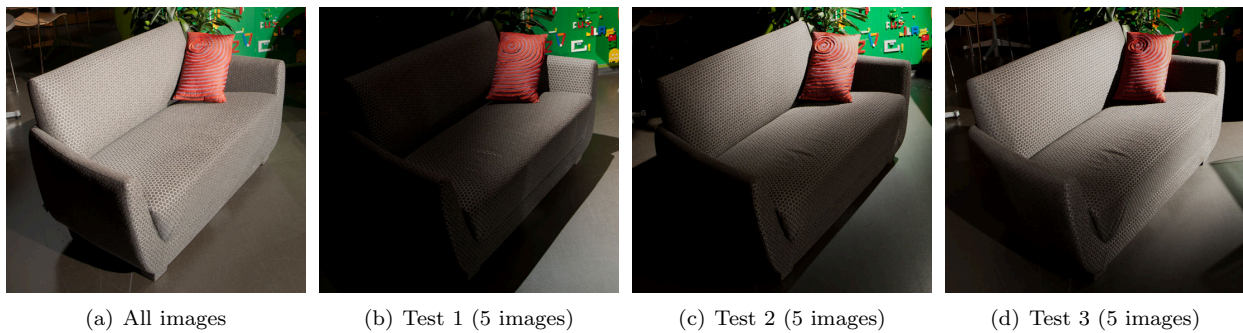


Figure 13: Our **edge light** optimized for the **central sofa** object.

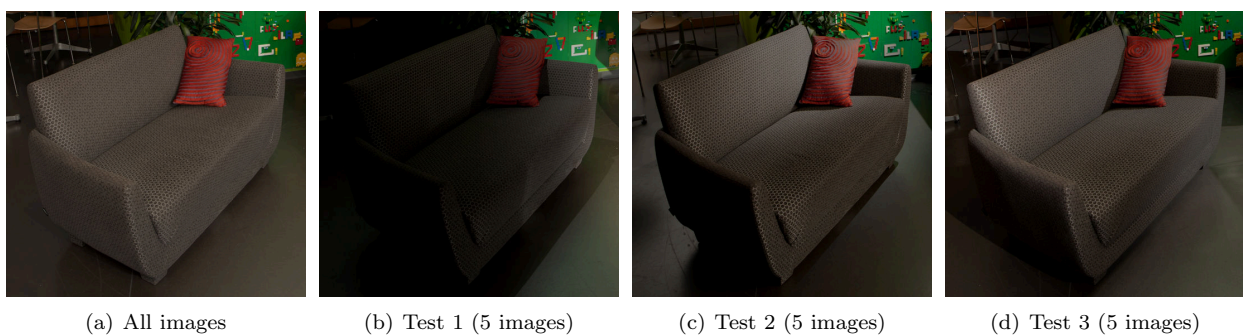


Figure 14: Our **diffuse light** optimized for the **central sofa** object.

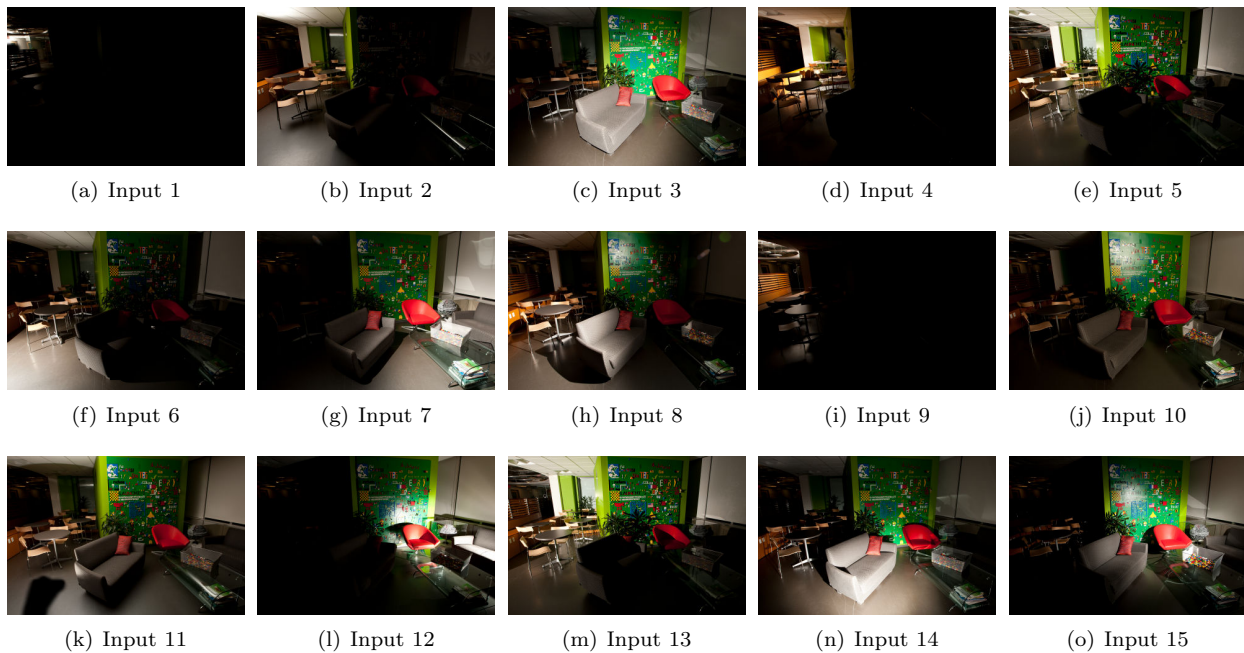


Figure 15: **Test 4: Random selection of 15 images.**

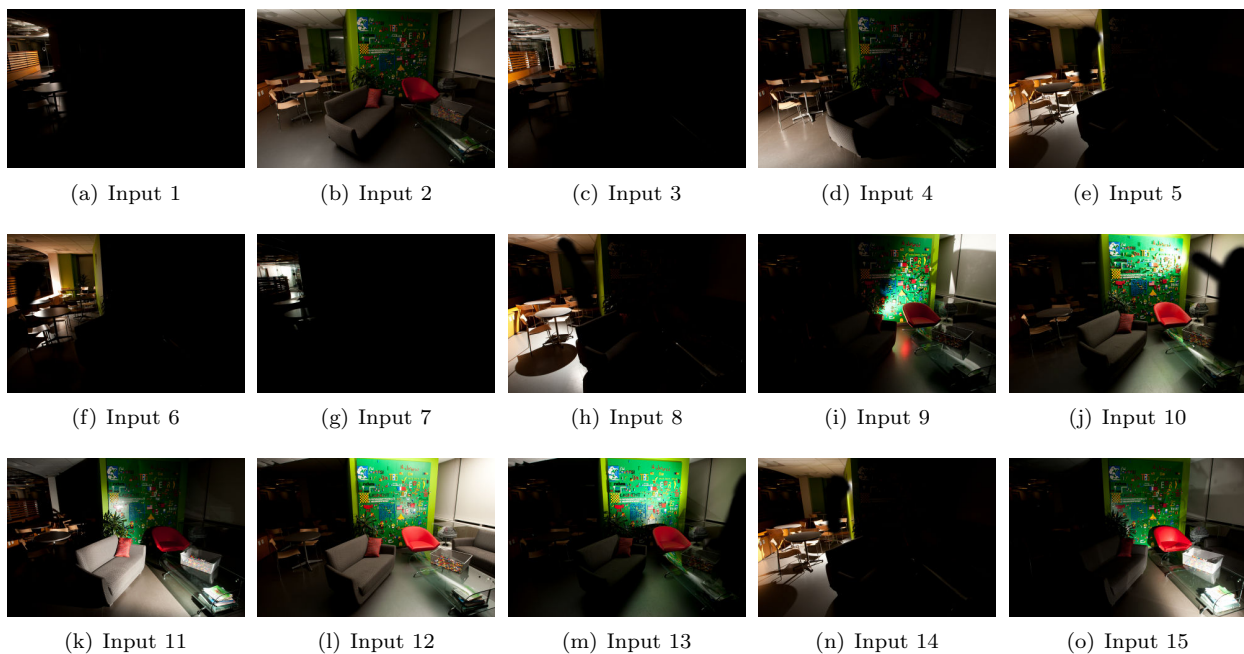


Figure 16: **Test 5: Random selection of 15 images.**

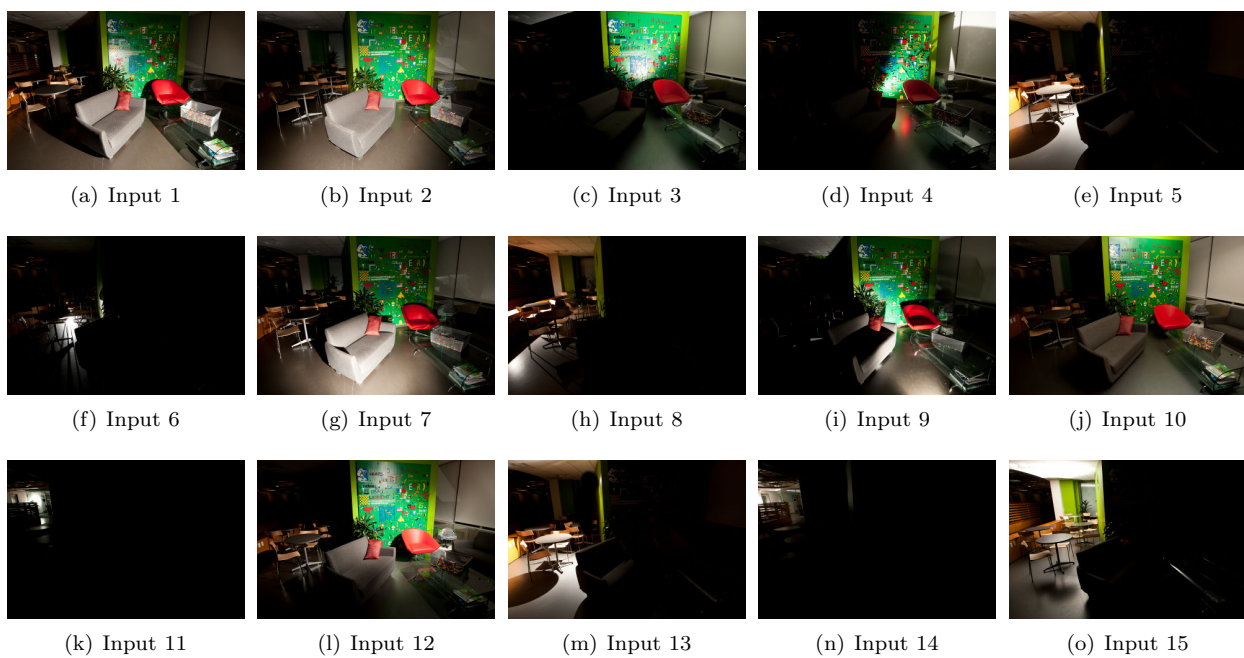


Figure 17: **Test 6: Random selection of 15 images.**



Figure 18: Our **edge light** optimized for the **red chair** object.



Figure 19: Our **diffuse light** optimized for the **red chair** object.

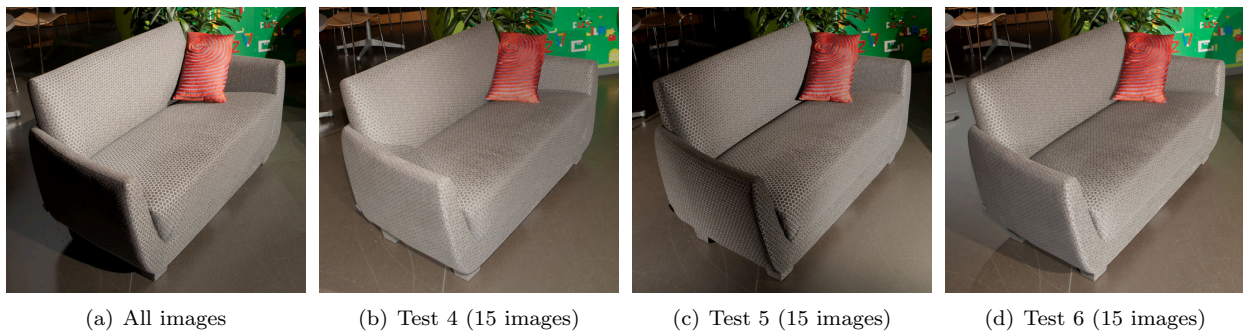


Figure 20: Our **edge light** optimized for the **central sofa** object.

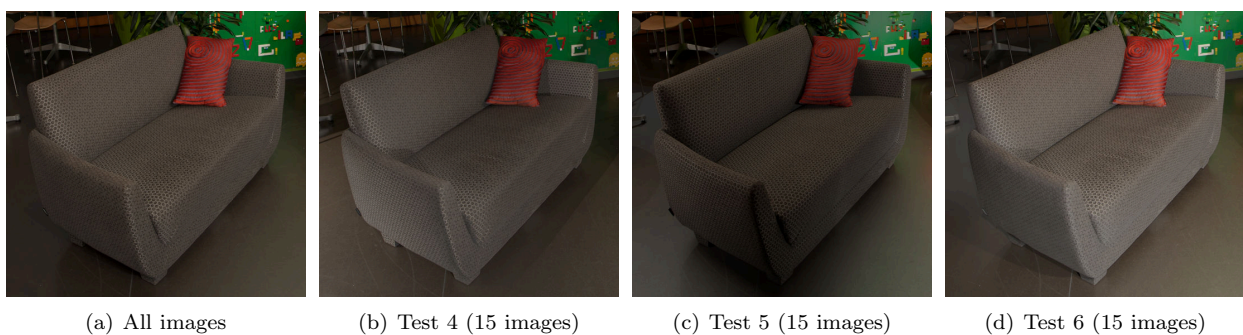


Figure 21: Our **diffuse light** optimized for the **central sofa** object.

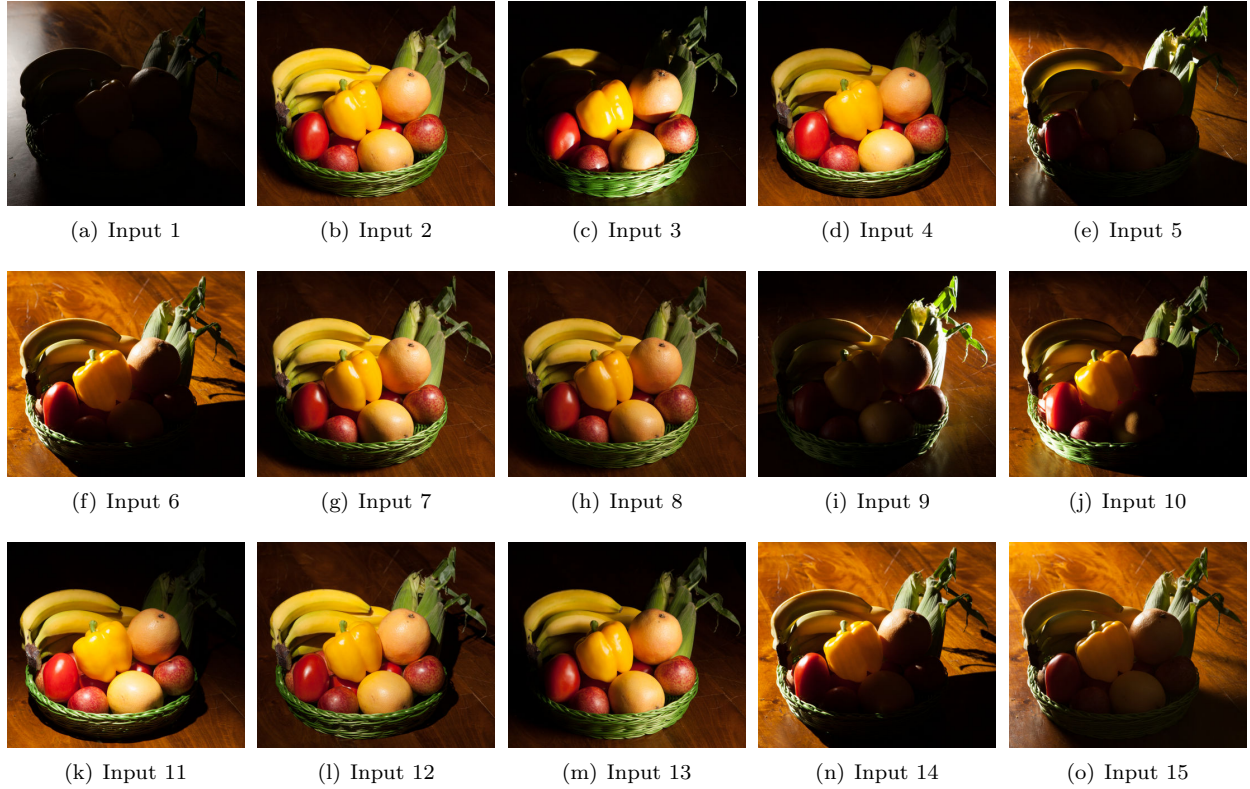


Figure 22: **Test 7: Random selection of 15 images.**

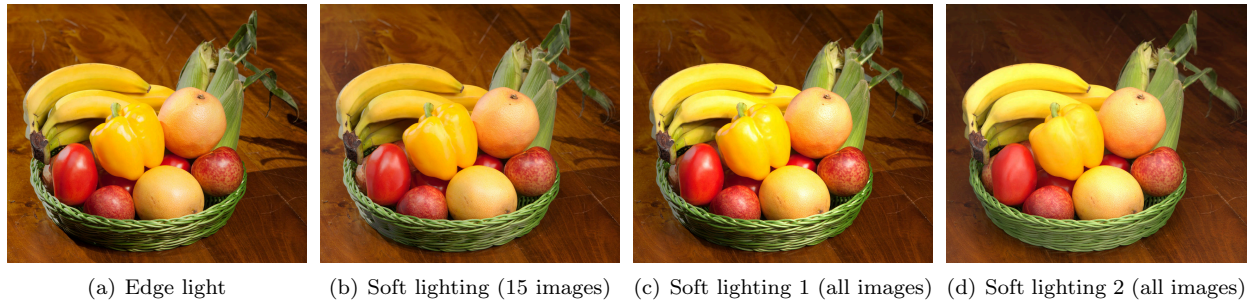
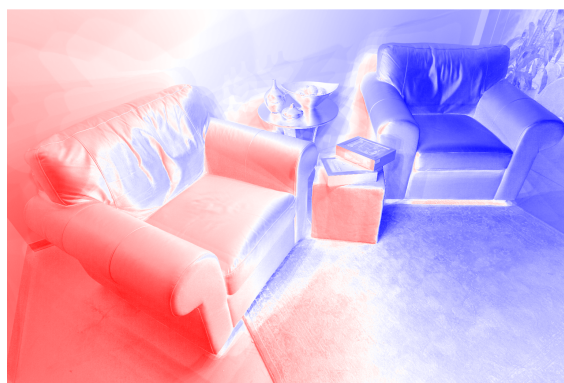


Figure 23: We evaluate the effect of our soft lighting modifier when using a smaller number of images (15 instead of 128). In (a) we show our edge-light, optimized on the randomly selected set of 15 images shown in Figure (23). In (b) we apply the soft lighting modifier on the lights in (a), using the set of 15 images. Note that this was the smoothest the cast shadows on the ground could get with that many images. In (c) and (d) we show a few intermediate steps of the soft lighting modifier applied on the lights in (a), using the original set of 128 images. Notice how the cast shadows on the ground and the highlights on the tomato get smoother. Using more images allows our soft lighting modifier to simulate a greater variety of area light sources to gradually produce smoother results.



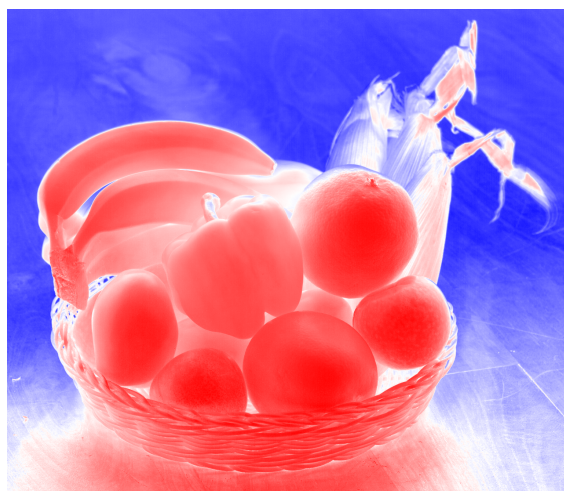
(a) Library



(b) Sofas



(c) Kitchen



(d) Basket



(e) House