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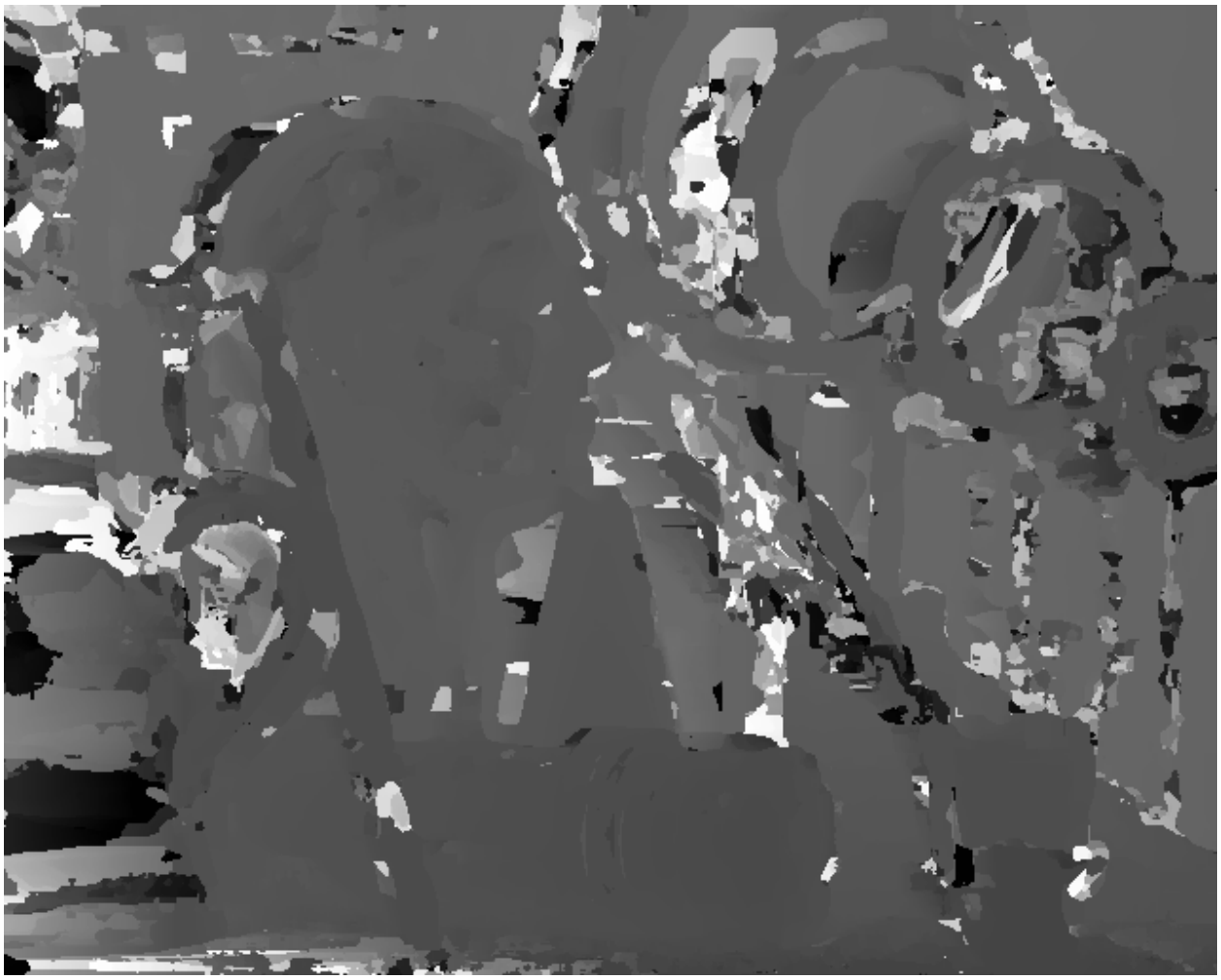
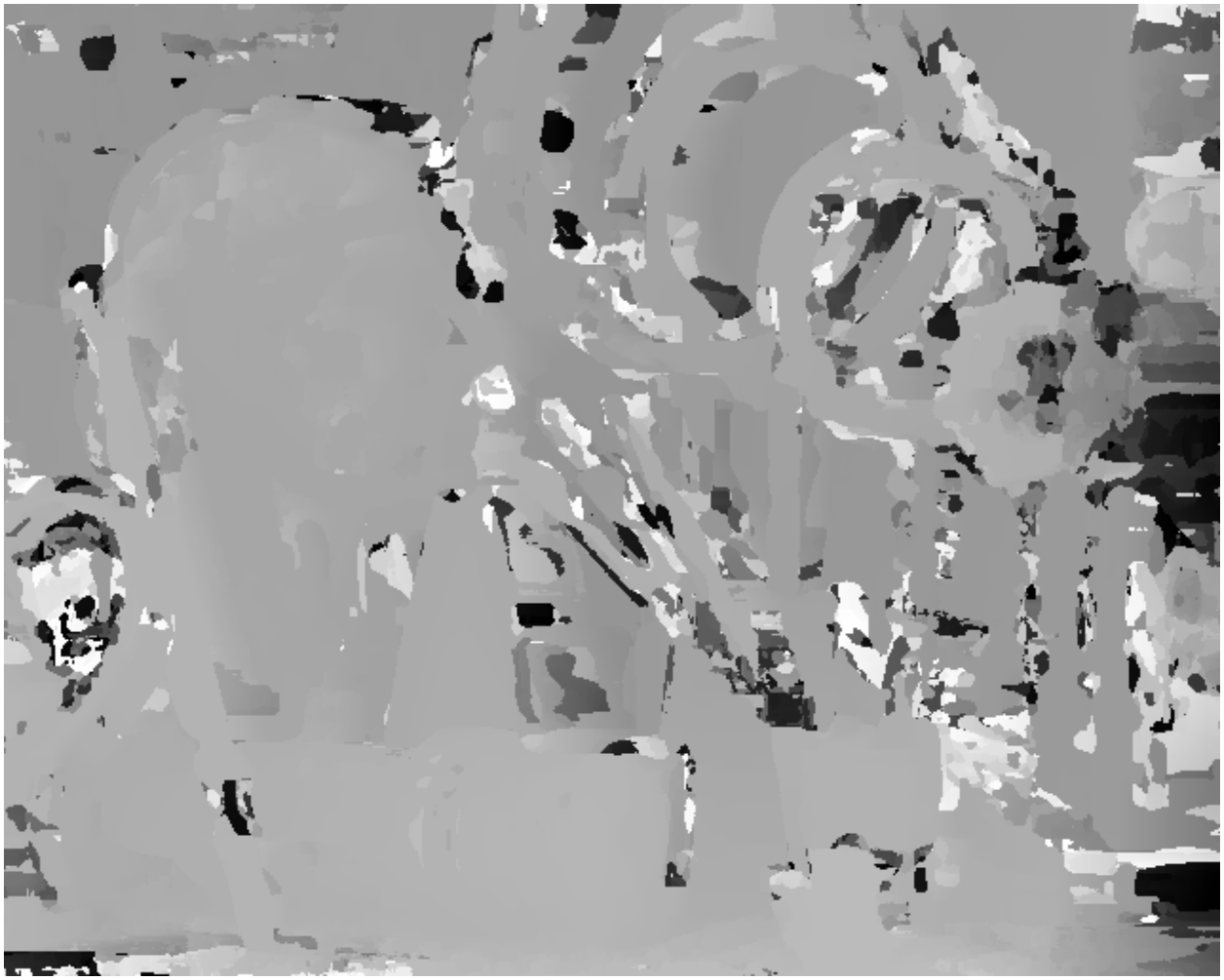
CS4495 Spring 2015 OMS
ps2

Question 1:
Disparity Left Disparity Right

Question 2a:
Disparity Left



Disparity Right



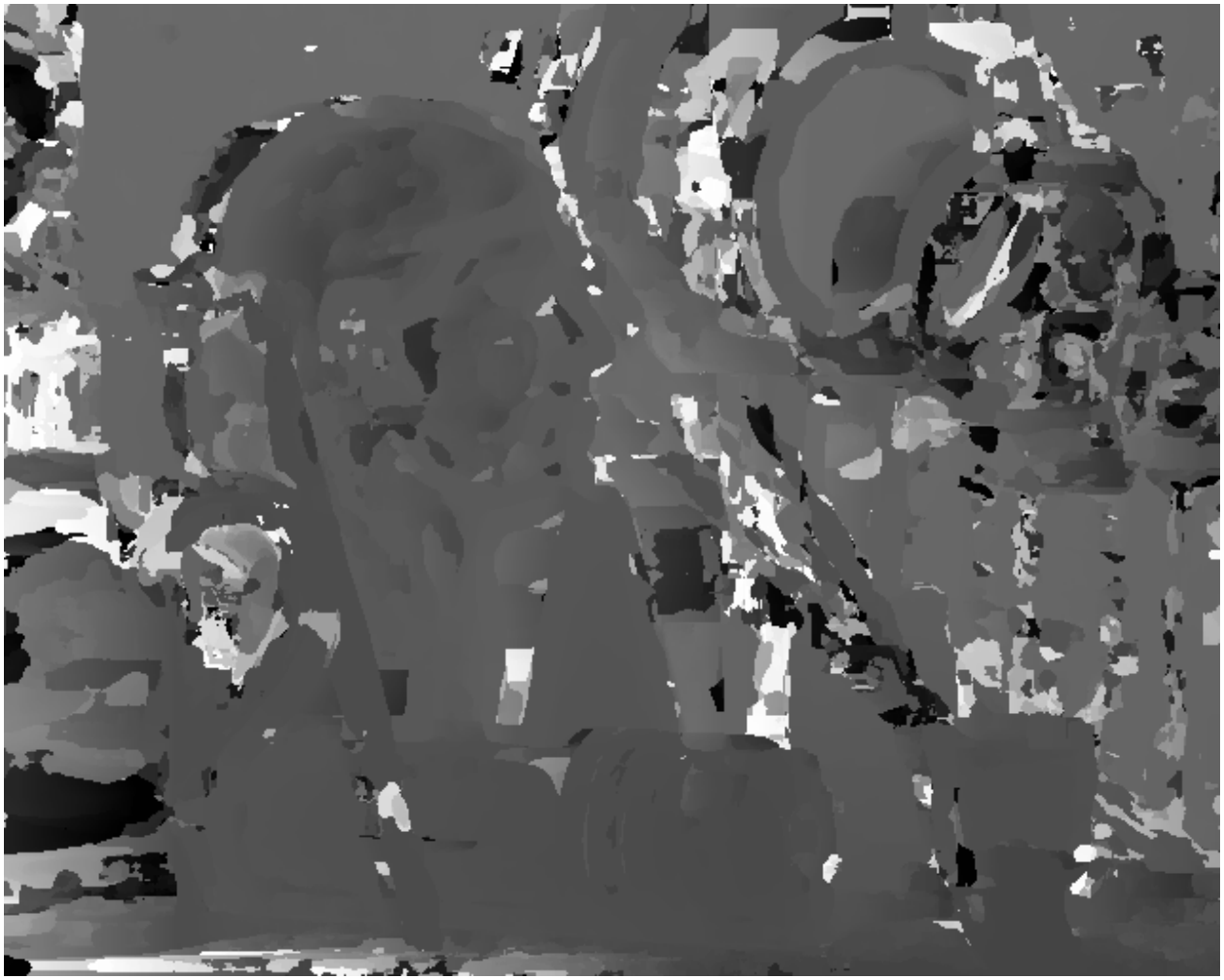
Question 2b:
These images look pretty bad when compared with ground truth. However, the shapes are definitely distinguishable. While the apparent disparity seems small (the rings are almost the same shade), the black and white matches skew the scaling of the shading. We would be far more successful if we removed outliers from our estimations (where disparity is too large or use some influence from neighbors, and/or incorporate some thresholding). This would improve the scaling, but might also give better matching.

Question 3a:
Disparity Left When Left Image Blurred

Disparity Right When Left Image Blurred

While most of the shapes are still recognizable, there is significantly more splotching. The “Disparity Left” seems to have even more splotching than the “Disparity Right”. Same shapes (like the closest ring) are incomplete. But even with the splotching determining distance for major objects should still be feasible.

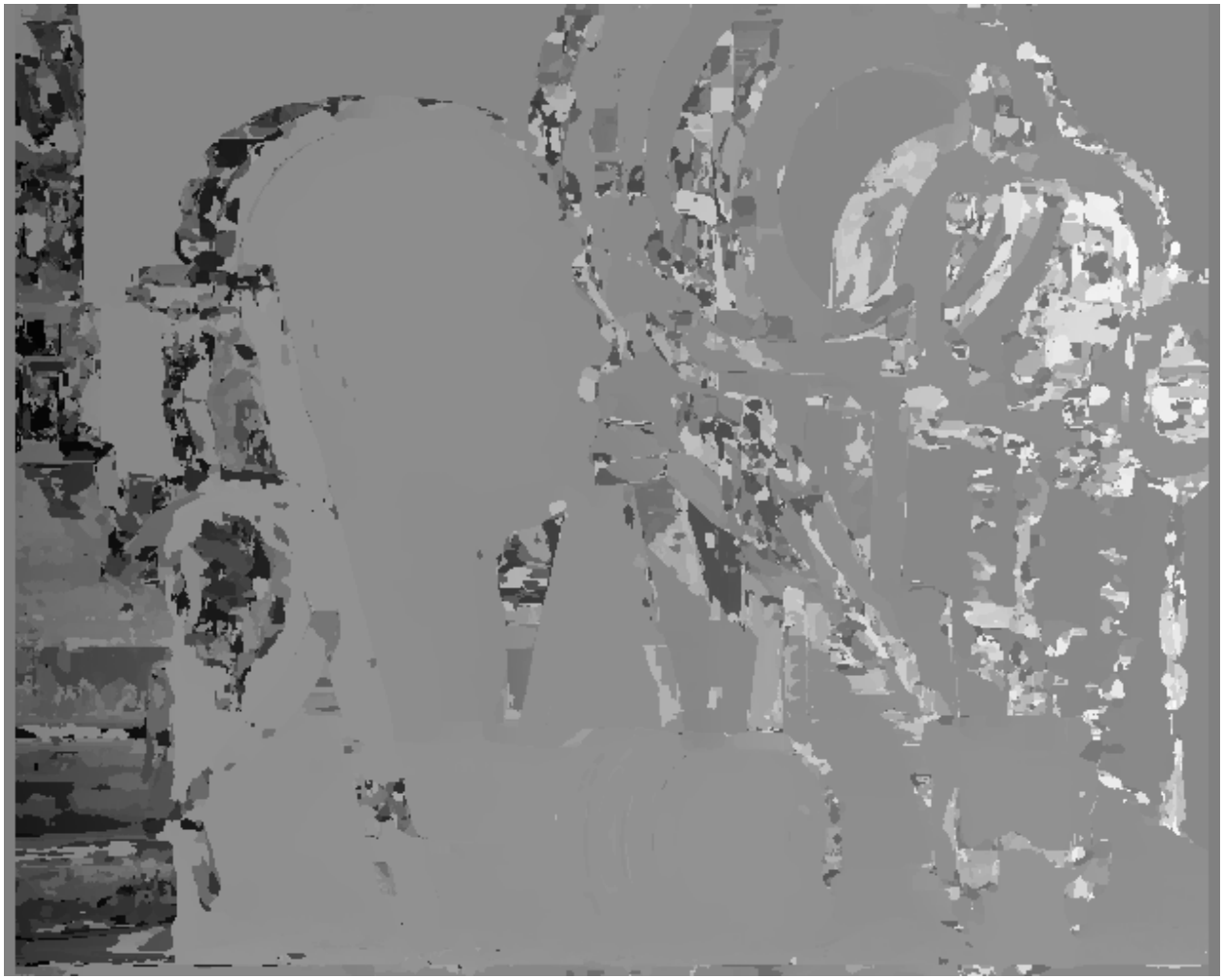
Question 3b:
Disparity Left when Left Contrast +10%



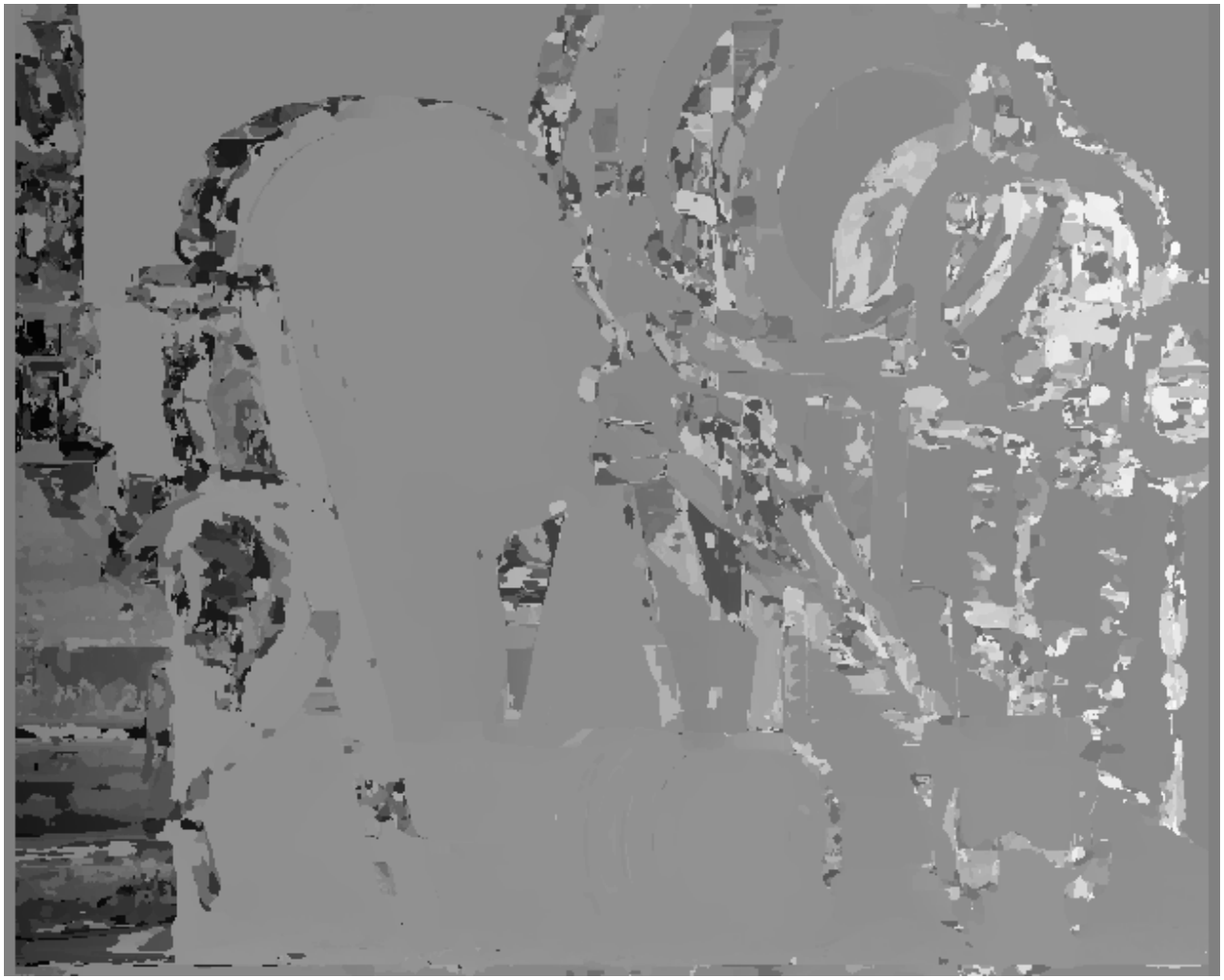
Disparity Right when Left Contrast +10%

The bad effects with extra contrast are not as significant as with blurring. Also contrast is a quality that can be mitigated by normalizing the contrast of the entire image. Other than contributions from shapes occluded in one image and not another, the average pixel value and distribution can be leveled in one image to match the other.

Question 4a:
Disparity Left with Normalized Correlation



Disparity Right with Normalized Correlation



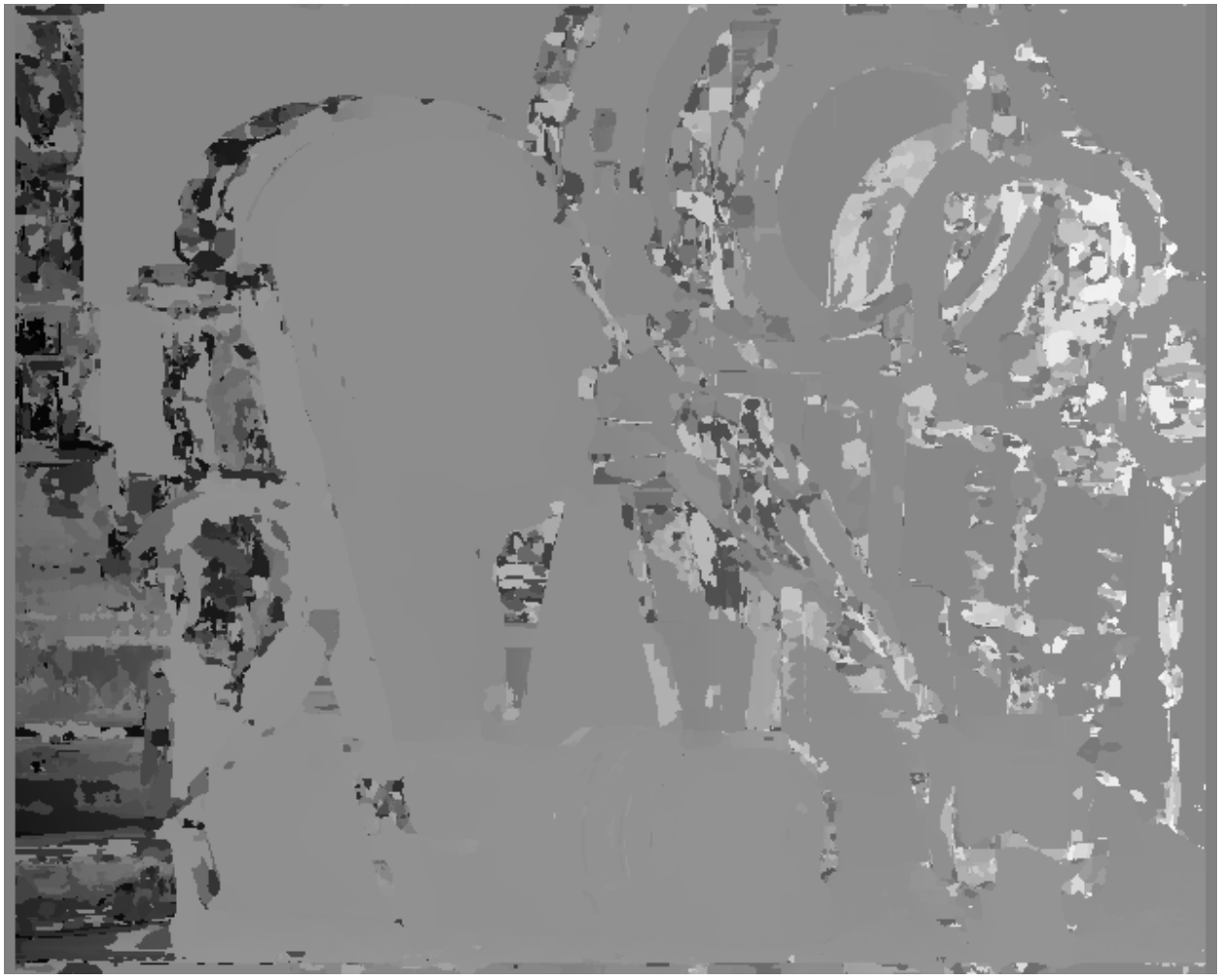
These images seem a bit better than the disparity images from sum of squared distances. However, they also seem to have scaling issues. Some of the pixels have matched with very distant blocks causing a large scale that washes out the disparity differences.

Question 4b.
Left Disparity Normalized Correlation When Left Image Blurred

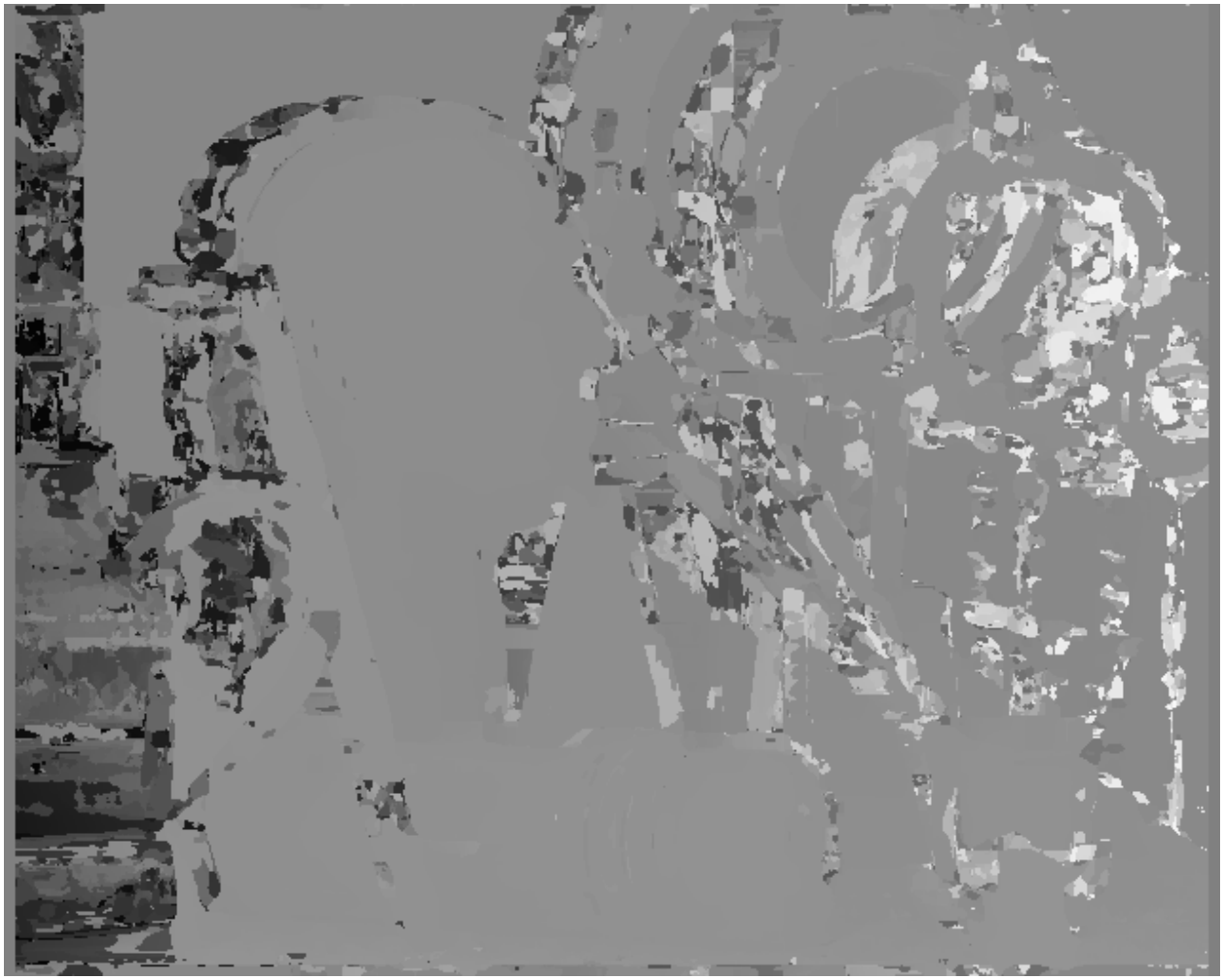
Right Disparity Normalized Correlation When Left Image Blurred

These images performed significantly worse than the sum of squared error. Only one right is distinguishable and the splotchiness makes most of the information unusable.

Left Disparity Normalized Correlation When Left Image +10% Contrast



Right Disparity Normalized Correlation When Left Image +10% Contrast



The contrast has little effect on disparity calculations using normalized correlation. This should be expected because rather than subtracting pixel values we are multiplying them and then normalizing. Any scaling will cancel out because of the normalization.

Question 5a:
I first compared with no changes to images. Then I tried to calculate disparity with both images blurred. I also tried to sharpen the images to see if it would improve disparity calculations. If time had permitted, I would like to do a multi-channel comparison to see if color improves results. I suspect with some some of the striping that incorporating color would improve results.

Here are the best disparity images that I generated (the base images without any blur or shappening generated the best results):

Left Disparity

Right Disparity