Problem Set 2

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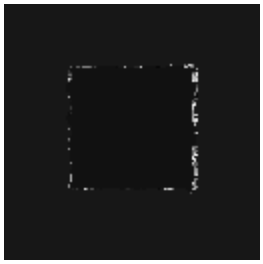
02/22/2015

Problem 1

A.

D_L



D_R

Problem 2

B.

The major difference between the images generated and the ground truth is the large amount of noise around the edges. We can see vague outlines of the different objects, and kind of perceive the differences in depth, however, it's hard to tell exactly as the differences are not as pronounced as in the ground truth. The noise around the edges of objects leads to a lot of unreliable signal in that area, which also messes up the scaling when displaying the disparities in other areas.

Problem 3

A.

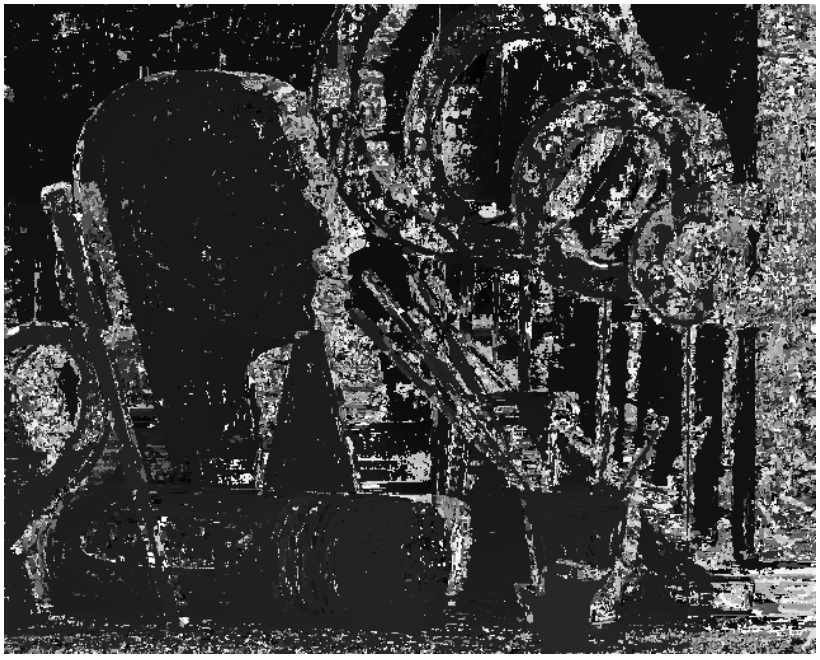
While the bigger features(such as the head are more readily visible, the noise basically messes up all the smaller features, making an disparity/depth knowledge in those areas not visible.

B.

The contrast messes up the disparity recognition a lot more than the noise(as expected). We can still kind of see the values in one of the images D_L around the head, but in D_R, the head is barely visible as a single object and the depth of other objects is not visible. This is expect, as adding contrast makes the SSD calculations very unreliable.

Problem 4

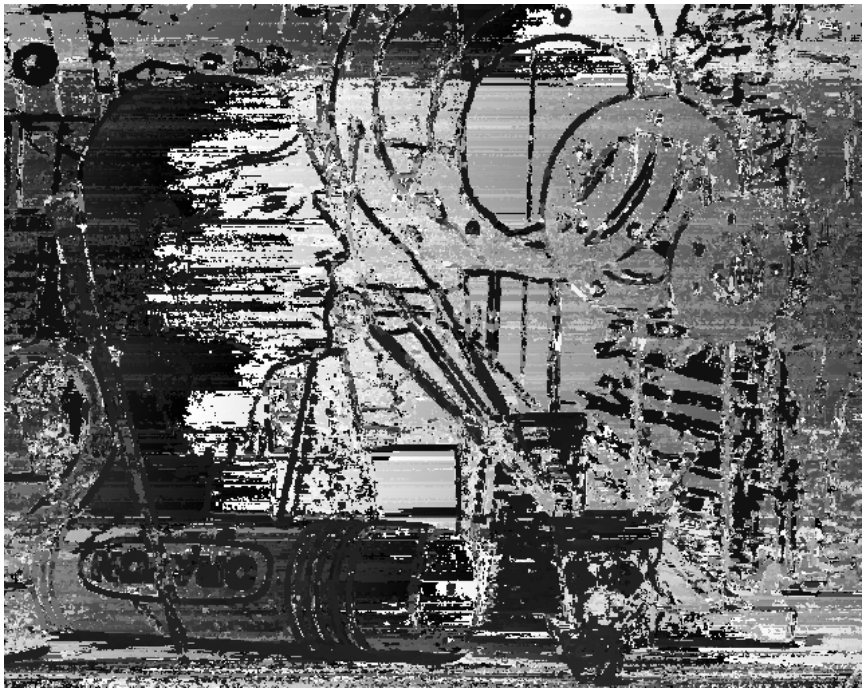
A.



The depths of different objects are more easily visible in images generated via this method. However, the in the edge areas, we see a lot more graininess. This inability at the edge areas also makes it difficult to display the rest of the image(as the disparities are scaled up accordingly), making it not a good representation when compared to the ground truth.

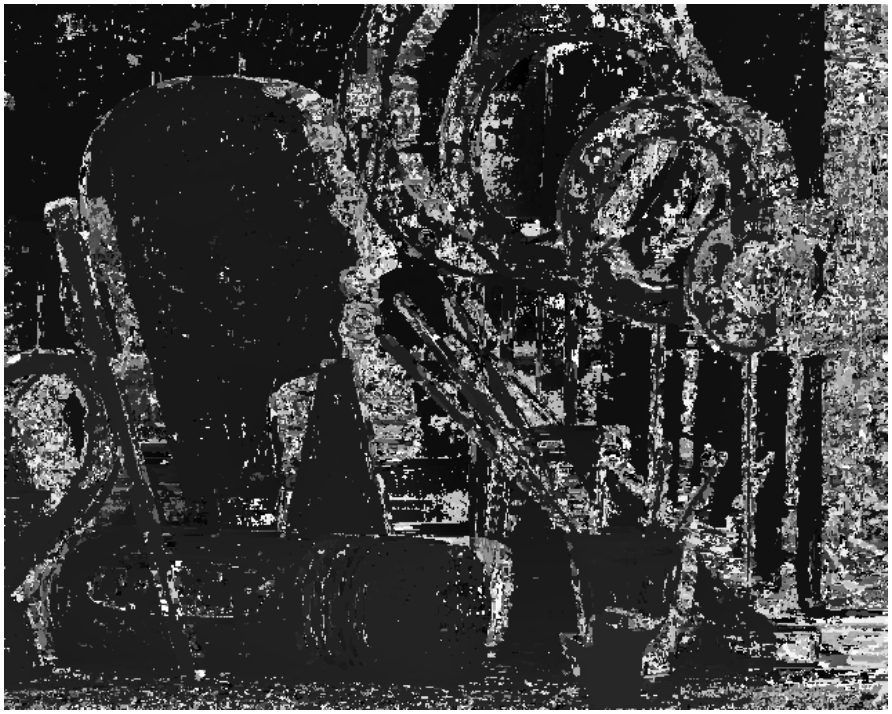
B.

Noise



The noise has a much worse effect on this image than for the image calculated using SSD. The edges are barely visible, and the concept of depth is almost completely lost.

Contrast



The contrast images are worse than the regular image, but better than both the noise image, as well as the contrast image for SSD. This is expected, as the normalized correlation takes into account for contrast by normalizing the image with auto-correlation of the source images.

Problem 5

The best images we could produce, were done by sharpening the image(using a gaussian blur with size 13x13 and sigma 1). Then we used an unsharpen mask, generating an image

which was L*1.5 - blurred*0.5. Then we applied the SSD method, which gave us the best result. We tried various kernel sizes, both the algorithms, and trying the application on both the sharpened and the blurred image. The best result we got is far from the ground truth. We can see some definition of the objects, and the edges are visible as well, the depth in the background through the grill is recognizable. However there is a lot of noise, and judging a depth further becomes extremely hard. Also, we can see a lot of horizontal lines, that are characteristic of a window based approach.