Lab Assignment-2

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# Shape from Stereo

Stereo vision is the process of recovering depth information from camera images by comparing two or more views of the same scene. Binocular stereo uses only two images, typically taken with parallel cameras that were separated by a horizontal distance known as the "baseline." The output of the stereo computation is a disparity map which tells how far each point in the physical scene was from the camera.

1) The stereo images were taken from: http://vision.middlebury.edu/stereo/data

2) The zip folder consists of left_image, right_image, disp0-n.pgm (ground truth for left image), disp1-n.pgm (ground truth for right image). These are the inputs to the code Disparity.m

3) The code computes the disparity by using a template from right_image and comparing blockwise on the left_image and returns two output figures. The first figure is the calculated disparity map, the second figure is the ground truth disparity map for the left image.

4) A template of certain dimension (here 3 by 3 pixels) is chosen from the right side image and is compared with blocks of the same dimension of the left image.

5) The simple absolute difference method (SAD) is used to compare the template and the blocks. The block with the minimum absolute difference is chosen for disparity mapping

6) The resulting image was inverted with pixel intensity 255 so as to correspond to the ground truth provided.

7) The baseline distance as mentioned in the website was 178.089 mm for the first case and 174.019 mm for the second.

8) Images were taken with a cell phone camera and input to the code but a proper disparity map could not be obtained. Analysis and comparison with the previous stereo images showed that the lighting conditions influenced this particular feature.

The following are the results obtained:

Figure 1: Left image

Figure 2: Right Image

Figure 3: Calculated Disparity Map

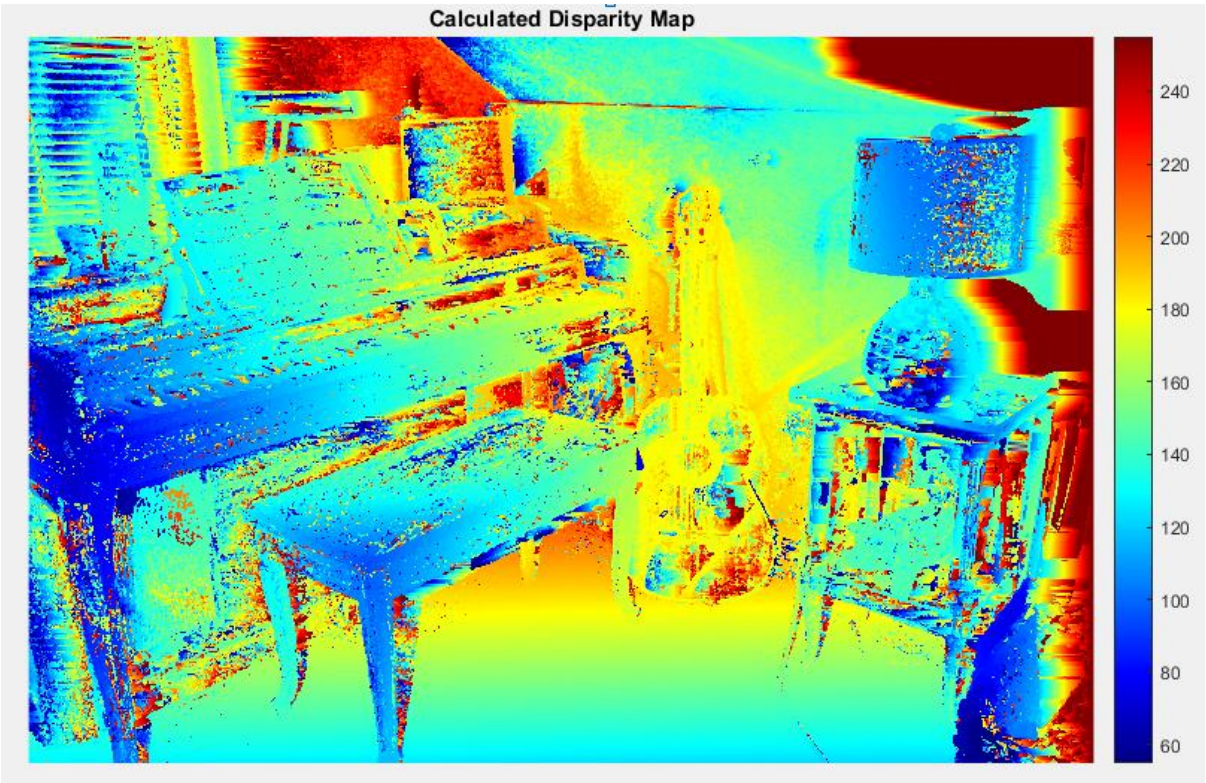


Figure 4: Ground truth Disparity Map

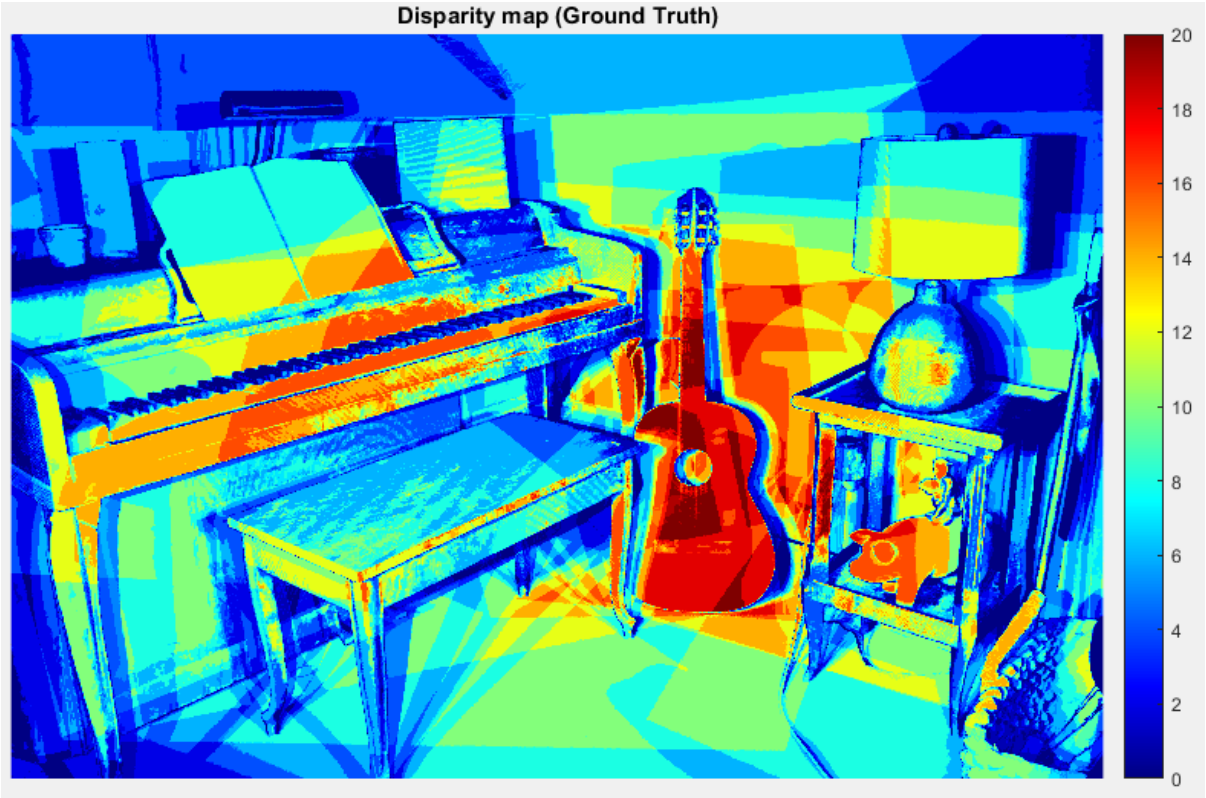

Figure 5: Left Image

Figure 6: Right Image

Figure 7: Calculated Disparity Map

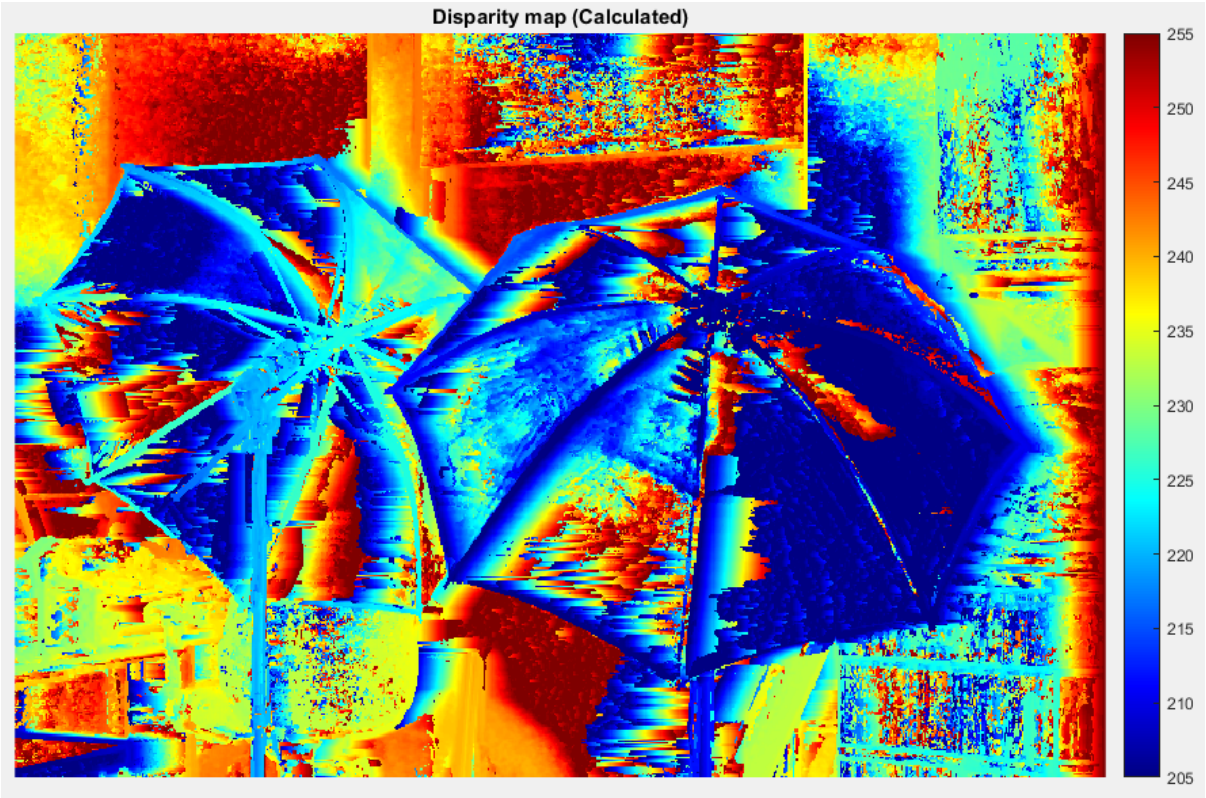


Figure 8: Left Image

Figure 9: Right Image

Figure 10: Disparity map