AER1515 Assignment 3 Report

Kevin Hu

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1 Depth Estimation

Figure 1: Depth Map for Test Image 1

Figure 2: Depth Map for Test Image 2

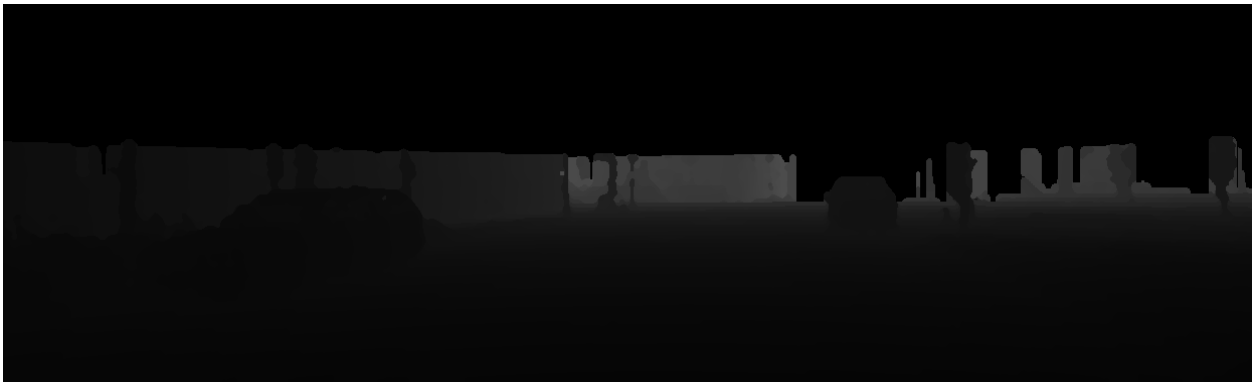

Figure 3: Depth Map for Test Image 3

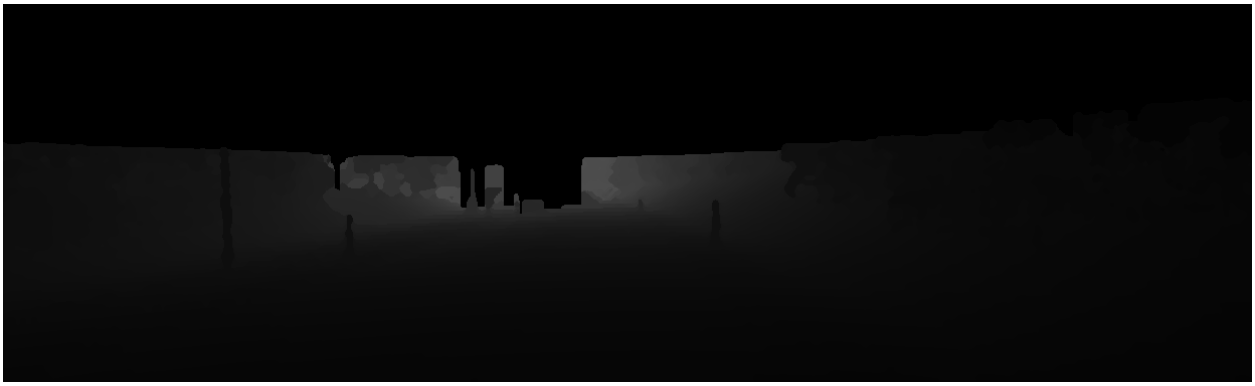

Figure 4: Depth Map for Test Image 4

Figure 5: Depth Map for Test Image 5

Quality of depth images are quite good. You can see the different trees on the side of the road in the first image. In the second image you can see the car as well as the trees on the side of the road. In the third image, you can see both vehicles as well as tree stumps and sign posts. For the fourth image, you can see some of the trees and poles along the side of the road. For the fifth image, you can see both cars as well as many of the poles

in the image. Some environmental factors that lead to good performance was that all the images were taken in sunny weather in the middle of the day allowing for good visibility and lighting, leading to a better disparity and depth result. If the images were taken in the night time or in poor weather where there is low visibility, there may be worse performance. There may not be enough light for the stereo camera to pick up, leading to a less detailed depth image, or poor enough visibility such that light interacts with the weather conditions and stereo camera differently.

2 2D Bounding Box Estimation

Figure 6: 2D Detection Bounding Boxes for Test Image 1

Figure 7: 2D Detection Bounding Boxes for Test Image 2

Figure 8: 2D Detection Bounding Boxes for Test Image 3

Figure 9: 2D Detection Bounding Boxes for Test Image 4

Figure 10: 2D Detection Bounding Boxes for Test Image 5

The confidence threshold used for images 3 and 4 were 0.5, while the rest of the images used a confidence threshold of 0.7. All images used a non-maximum suppression threshold of 0.6.

3 Instance Segmentation

Figure 11: Segmentation Image for Test Image 1

Figure 12: Segmentation Image for Test Image 2

Figure 13: Segmentation Image for Test Image 3

Figure 14: Segmentation Image for Test Image 4

Figure 15: Segmentation Image for Test Image 5

The segmentation masks were created using the method suggested. Note that the distance to centroid parameter was first tuned on the training set, then fine tuned on the test set by observing the segmentation result and making any final adjustments. The centroid parameter would have to be different for each bounding box to get the best result.

The thresholds used were 10.5 on the first test image, 3.6 on the second test image, 3 on the third test image, 4.5 on the fourth test image, and 1.2 for the vehicle on the right and 6.6 for the vehicle on the left for the fifth test image.