

Project 3: Stereo Matching

ESE 358/CSE 327 Computer Vision, Fall 2000

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Due in two weeks, Thu. 11/30/00

Use the SSD method to do stereo matching as we discussed in class. The stereo image pair for the project is: head_left.ras and head_right.ras

The matching block size is 9×9 ie. $W = 4$ and assume the epipolar lines are horizontal (ie. there is no shift in the row direction). Base line and focal length are given as follows: $b=50\text{mm}$ and $f=19.6\text{mm}$.

Write a program to do the following.

1. (40 points) Calculate the disparity map, using SSD. Create an image that visualizes the disparity. (ie. the grey level of a pixel is analogous to the disparity of the pixel.) A simple test pair for disparity calculations will be given on the web site, test_left.ras and test_right.ras
2. (30 points) Produce a 3d shape description of the object. Use the disparity measurements to produce depth. Your output should be a list of points, that you will save to a file. A sample output file will be given on the web site as `sample_output.dat`. Your output file will be read by a 3D program that will allow you to view the results. More details on how to run the program will be posted on the web site.
3. (30 points) Experiment with different values of W , and discuss the changes in your output, in terms of correct matching and it terms of speed.
4. (30 points) Implement the normalized cross-correlation method that is described in your textbook. Compare the results with the results of SSD.

You will need to submit the source code of the functions for disparity calculations and depth computation. Also the disparity image and your 3D output data.

Note: There is a constant 130 pixel shift between left and right image, due to the image capture process, you should add this constant to you disparity results.