

Programming Assignment #2

Stereo Algorithm

Due: Thursday, May 1st

For this programming assignment you will implement a window based stereo algorithm using sum of squared differences to measure the similarity between pixels. You will hand in your source code and the result of running your program on the test images provided on the class webpage. Make sure to comment your program describing the major parts of the code and how they fit together.

Your program will take two images and compute the disparity of each pixel in the left image. The output of the program should be a grayscale image representing the disparities. When generating the output make sure to scale the disparity values to be in the 0 to 255 range, otherwise the disparity map will look very dark.

Your program should use integral images to run in time independent of the correlation window size. Test the stereo algorithm using different window sizes and comment on how the window size affects the quality of the output. Is there an optimal size? And if so what is it?

For the last part of the assignment, I would like you to modify the program to use windows of different sizes (or shapes) for each pixel. You should try to figure out how to automatically select the “best” window for each pixel. This part of the assignment is fairly open and there is no single correct answer. You should first come up with some theory on how to choose the window size for each pixel, then try it out to see if it works.