Disparity Map Estimation Using Graph Cuts

3D Computer Vision

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Changing the value of lambda

lambda = 0.01, lambda = 0.1, lambda = 1

Lambda is a regularization weight that controls how smooth the disparity map should be. We can see that the default value of 0.1 was a good one. If we reduce lambda too much, we end up with a map that presents some noise (it's easier to view it over the 3D reconstruction), in the sense that the disparity map has some "spikes". On the other hand, if we select a value for lambda that is too big, we end up with an almost flat disparity map which is indeed smooth but doesn't match the "real" disparities of the scene.

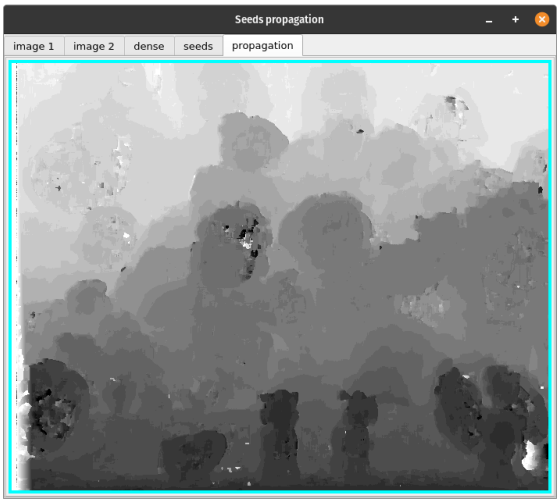
Changing the value of NCC neighborhood size

n = 2, n = 3, n = 8

The neighborhood size is defined as (2*n+1)*(2*n+1). Changing the value of n, changes the data term on the energy. While having a bigger neighborhood seems to improve a little bit, because the disparity should be more accurate, it also makes the algorithm slower, because we need to compute the correlation between bigger patches for each pixel.

Comparison with seeds algorithm

Computing the disparity map using graph cuts is much faster than computing it with the local seeds method. It also provides better results in terms of smoothness and precision, notice the "spikes" (points) on the disparity map obtained with the seeds method.



Seeds

Graph Cut