

CS676A: Introduction to Computer Vision

Assignment #2

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In this assignment we are implementing an interest point based matching algorithm. The assignment consists of three parts

1. A interest point detection step based on Harris corner detector.
2. A interest point descriptor using 16 histograms of gradients for the 16 sub regions (4 by 4) of the patch. You will experiment with different patch sizes in this step.
3. A matching step based on sum of squared distances (SSD) between the different interest points in the given pair of images.

1 Harris corner detector

Image set 1

Image 1



FIGURE 1: Original image 1



FIGURE 2: Image 1 corner points

Image 2



FIGURE 3: Original image 2



FIGURE 4: Image 2 corner points

Image set 2

Image 1



FIGURE 5: Original image 1



FIGURE 6: Image 1 corner points

Image 2



FIGURE 7: Original image 2



FIGURE 8: Image 2 corner points

Image set 3

Image 1



FIGURE 9: Original image 1



FIGURE 10: Image 1 corner points

Image 2



FIGURE 11: Original image 2



FIGURE 12: Image 2 corner points

2 Point based match

Image set 1



FIGURE 13: Patch size :8x8

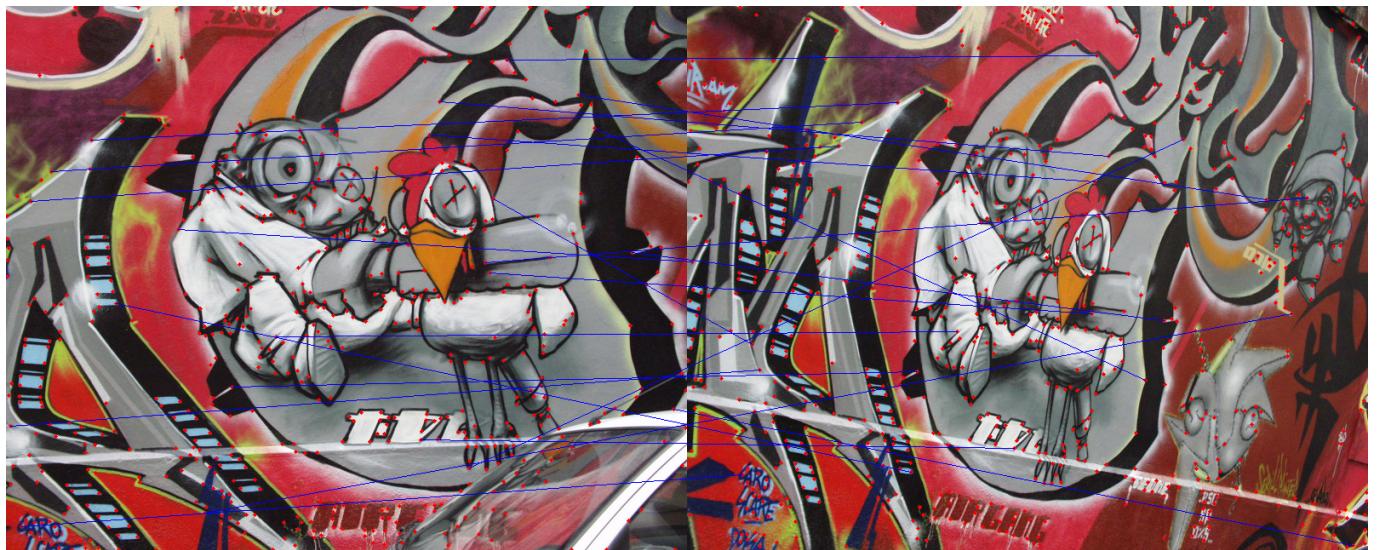


FIGURE 14: Patch size :12x12

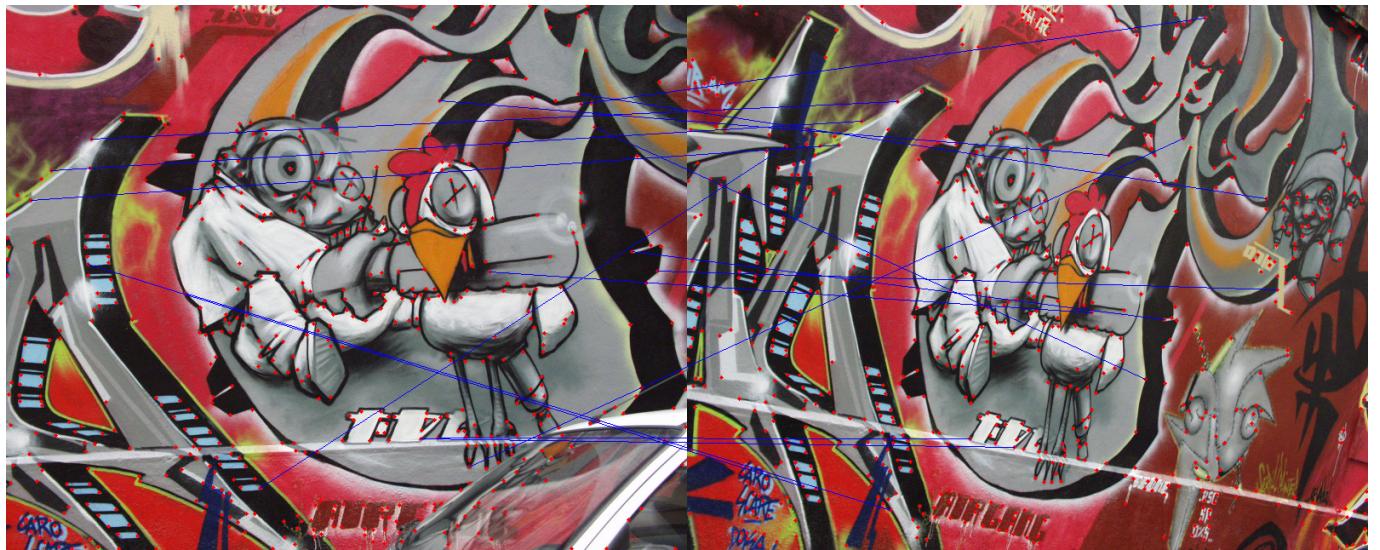


FIGURE 15: Patch size :16x16

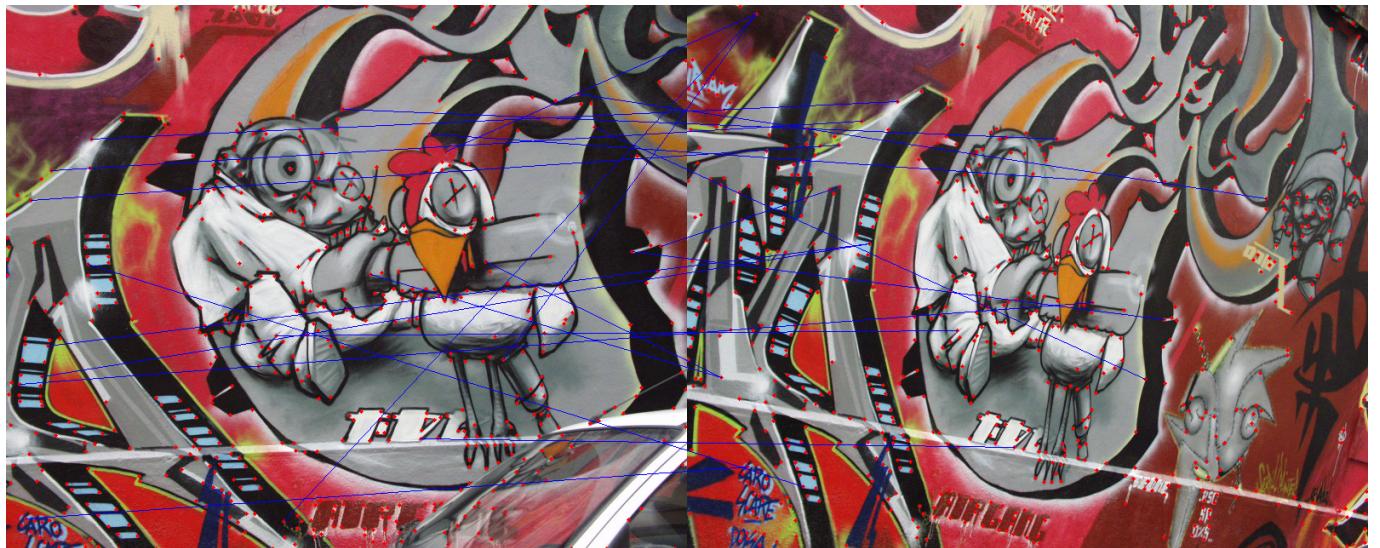


FIGURE 16: Patch size :20x20

Image set 2



FIGURE 17: Patch size :8x8



FIGURE 18: Patch size :12x12



FIGURE 19: Patch size :16x16



FIGURE 20: Patch size :20x20

Image set 3



FIGURE 21: Patch size :8x8



FIGURE 22: Patch size :12x12



FIGURE 23: Patch size :16x16



FIGURE 24: Patch size :20x20

3 Observation

From the above results one can easily see that as result of varying patch size keeping number of subregions fixed(i.e. 4x4) number matching corner points increases. If patch size is low then no. of matches will be low and even if patch point is same it won't accept it as a perfect match. As the patch size is increased number of matching corners also increases and for too high value invalid matches are also accepted. So for given threshold there exists a optimal size patch which gives almost perfect matching.