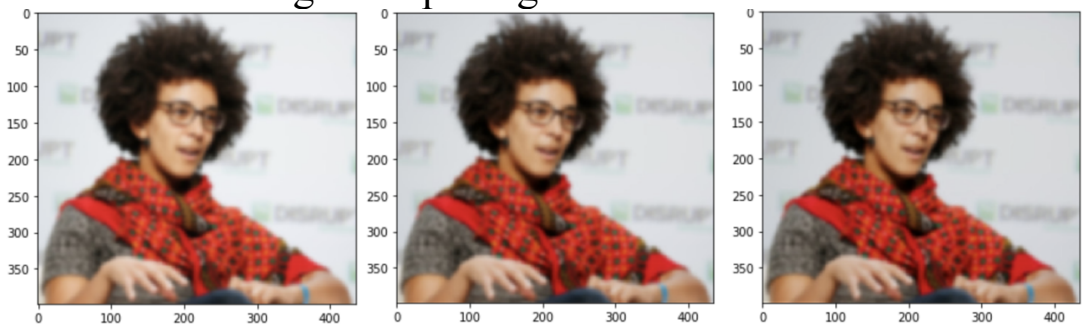
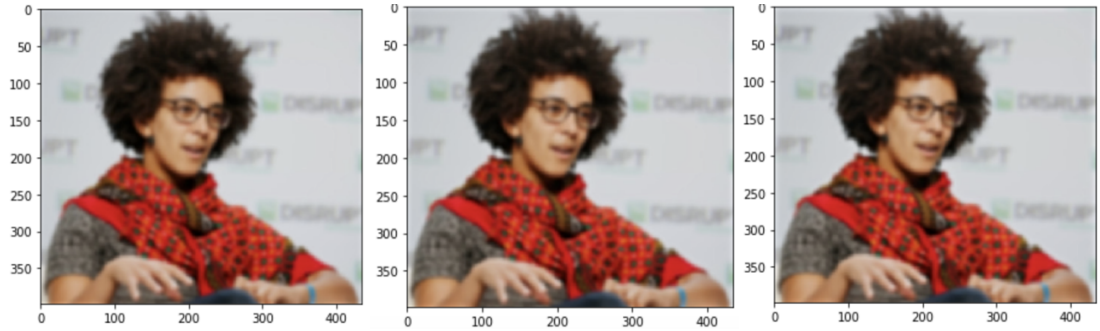
Report of CSCI631 homework1

Problem 1. Image Sharpening

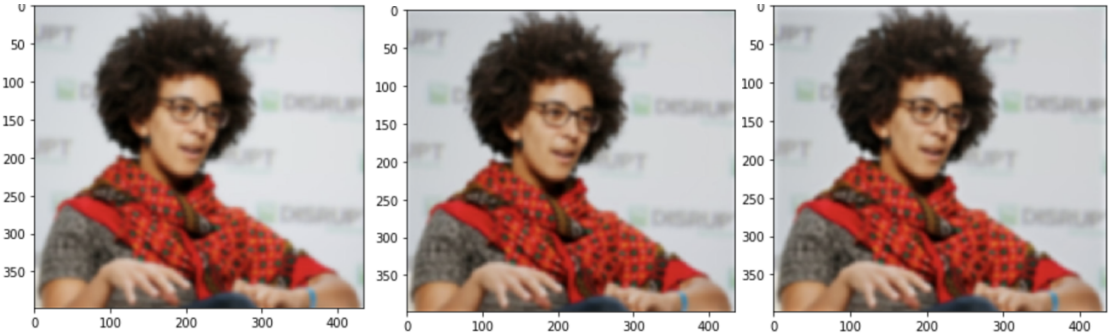


σ=1 σ=2



σ=3 σ=4 σ=5

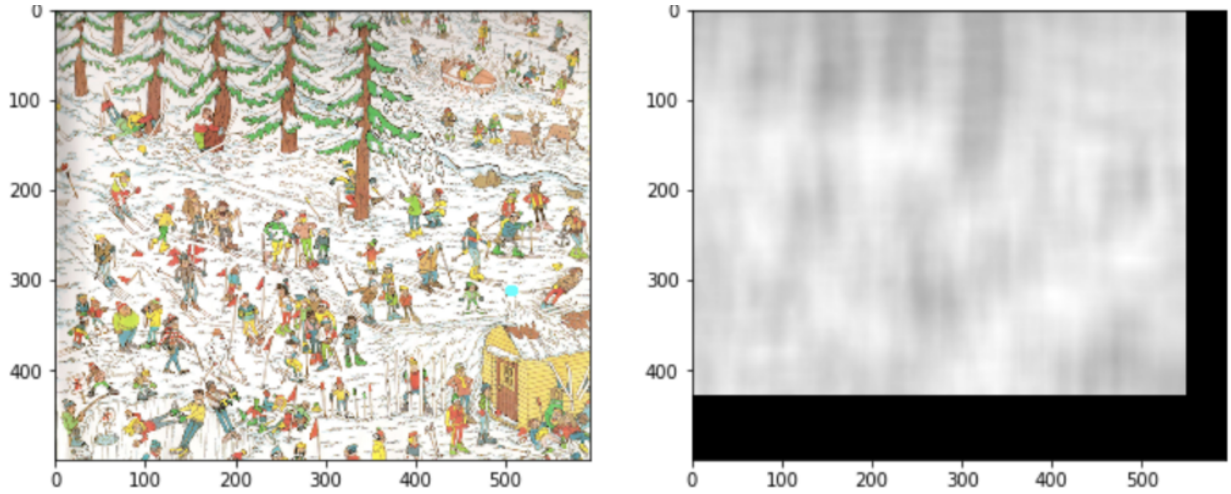
As the images shown above, the picture becomes clearer with the increase value of σ which is a key parameter of Gaussian filter. Also, σ is the standard deviation of the Gaussian distribution.



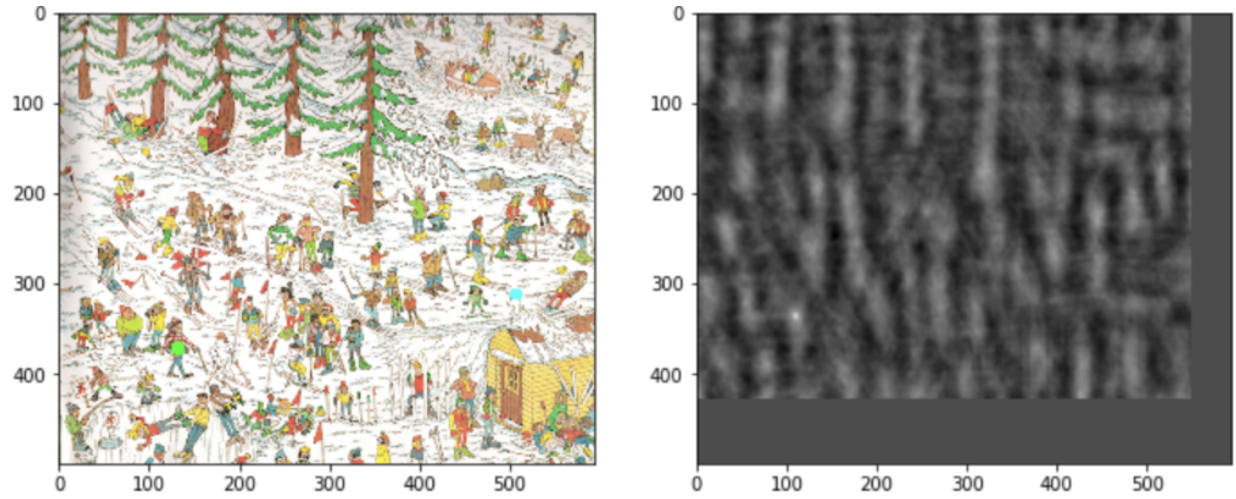
n=30 n=40 n=50

As the images shown above, with the increase value of n which represents the window size, the image also gets clearer. But we should be careful that with the increasing size of window, much more irrelevant points get involved which may affect the final results.

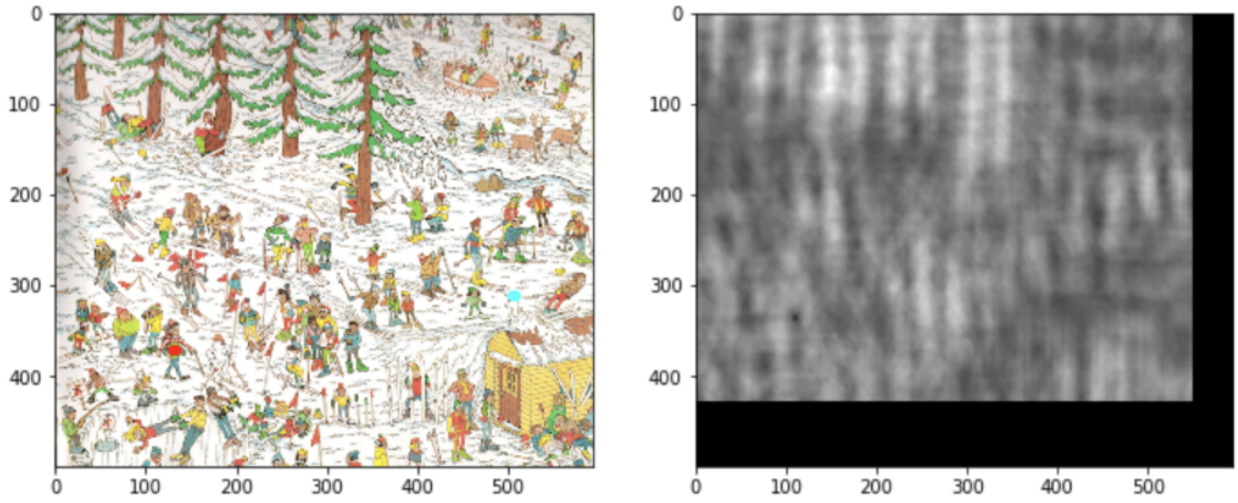
Problem 2. Finding Waldo – Template Matching



As the image shown above, we can conclude that if we use raw correlations, there might be a problem. From the circular cyan patch, we get a wrong match.



We can learn from the left image that the circular green patch is on the Waldo. As a result, we get a correct match and according to the image of normalized correlation map Z, the brightest spot would be the correct match.



This time we get a circular red patch which is still the correct match using SSD which is based on sum of squared differences.

Problem 3. Canny Edge Detector

Yes, I have read the article.