
COMP 6771 Image Processing: Assignment 2

Student name: YUNQI XU

Student id: 40130514

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1 Review

1.1 Review of Bilateral Filter

Bilateral Filter is one of the most important filter method which presented by Tomasi in 1998. The bilateral filter smoothing image and preserve edges information at the meanwhile.

The main method that the bilateral filter utilized are two Gaussian filters. One is calculated based on the Geometric closeness. Another is calculated based on their photometric similarity

1.2 Review of another paper

2 Re-implement of Bilateral Filter

In this section, we will firstly present the result of our re-implement method, and then compared the bilateral filter with other baseline algorithm in terms of other low pass filters that usually blur the image but also blur edges

2.1 Result of the Re-implement algorithm

In this section, we will use the images in the paper[cite here] to show our result that has successfully achieve the main goal which introduced by the paper.

Firstly, we present our result compared with the result indicated in the paper, with the same inputted parameters and the same pattern.

The result indicates that our re-implement method of Bilateral filter can output the same grey result no matter compared with built-in opencv method or printed on paper.

These images above indicate some other experiments which utilized the images provided by the paper.

There are some other color (3-channels) images which also indicate the successful re-implement of our code for bilateral filters.

2.2 Compare with other baseline algorithm

In this section, we compared the filter result of Bilateral filter with other baseline algorithm to present the advantages of our code.

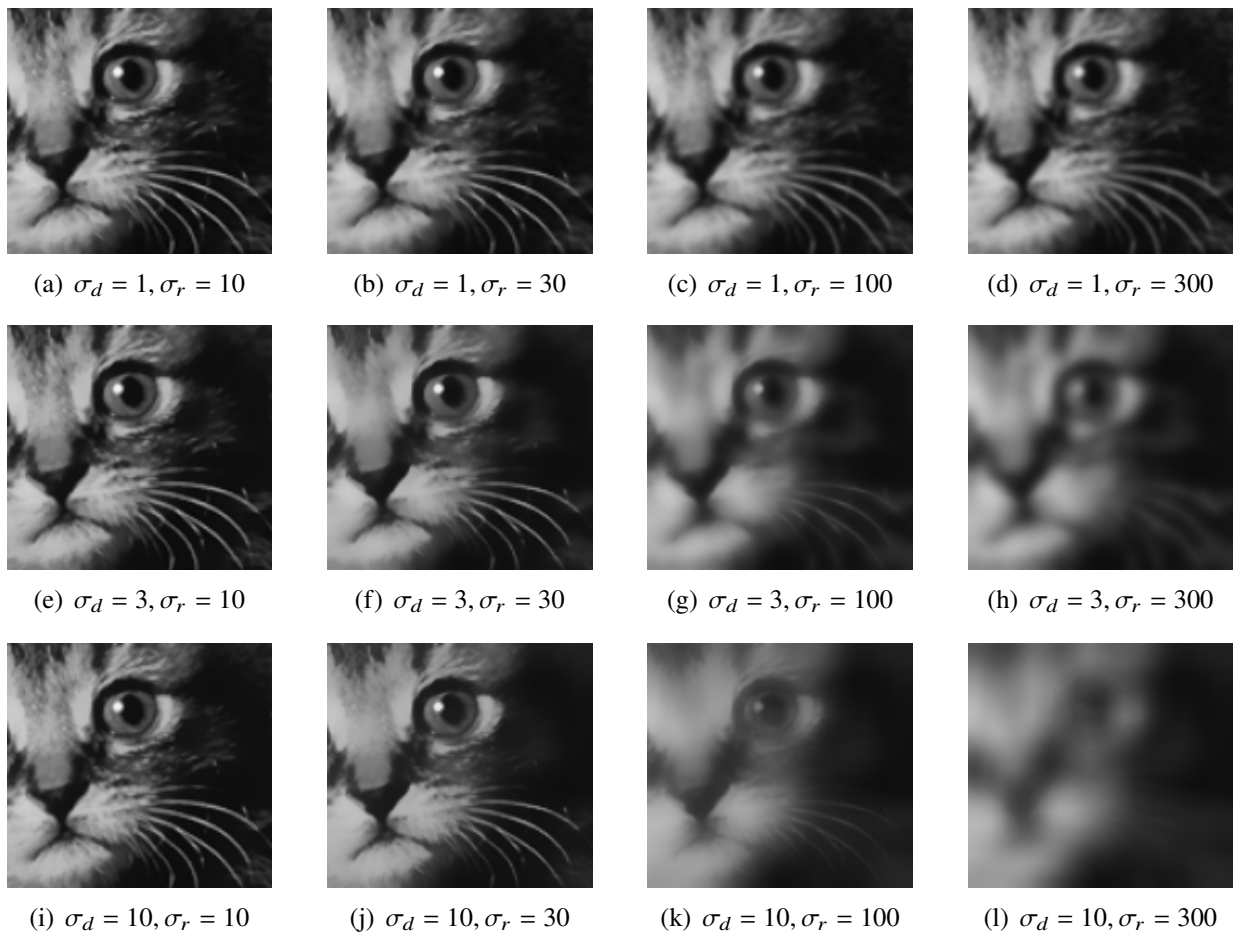


Figure 1: A detail figure with bilateral filters with various range and domain parameter values by implement code

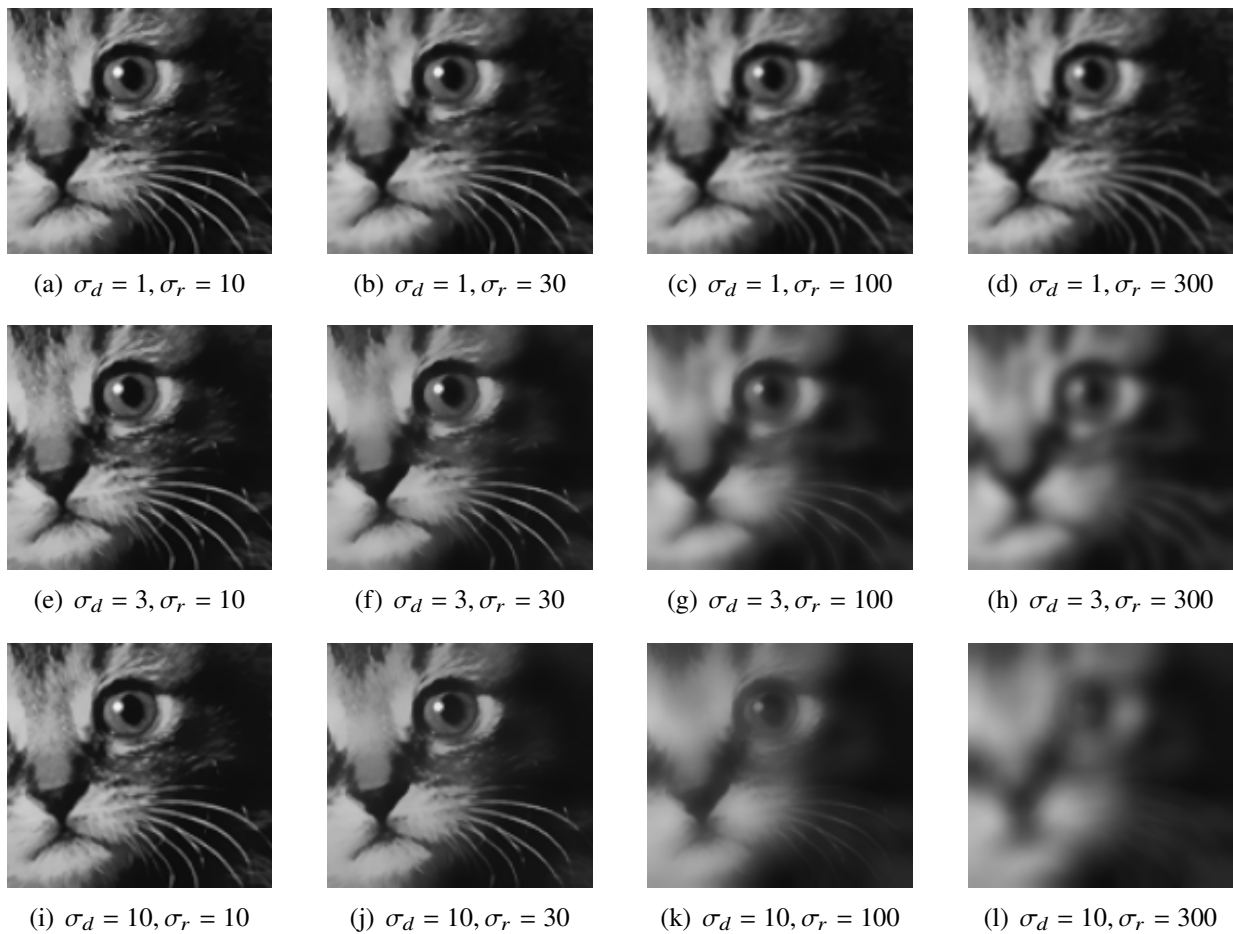


Figure 2: A detail figure with bilateral filters with various range and domain parameter values by Opencv python

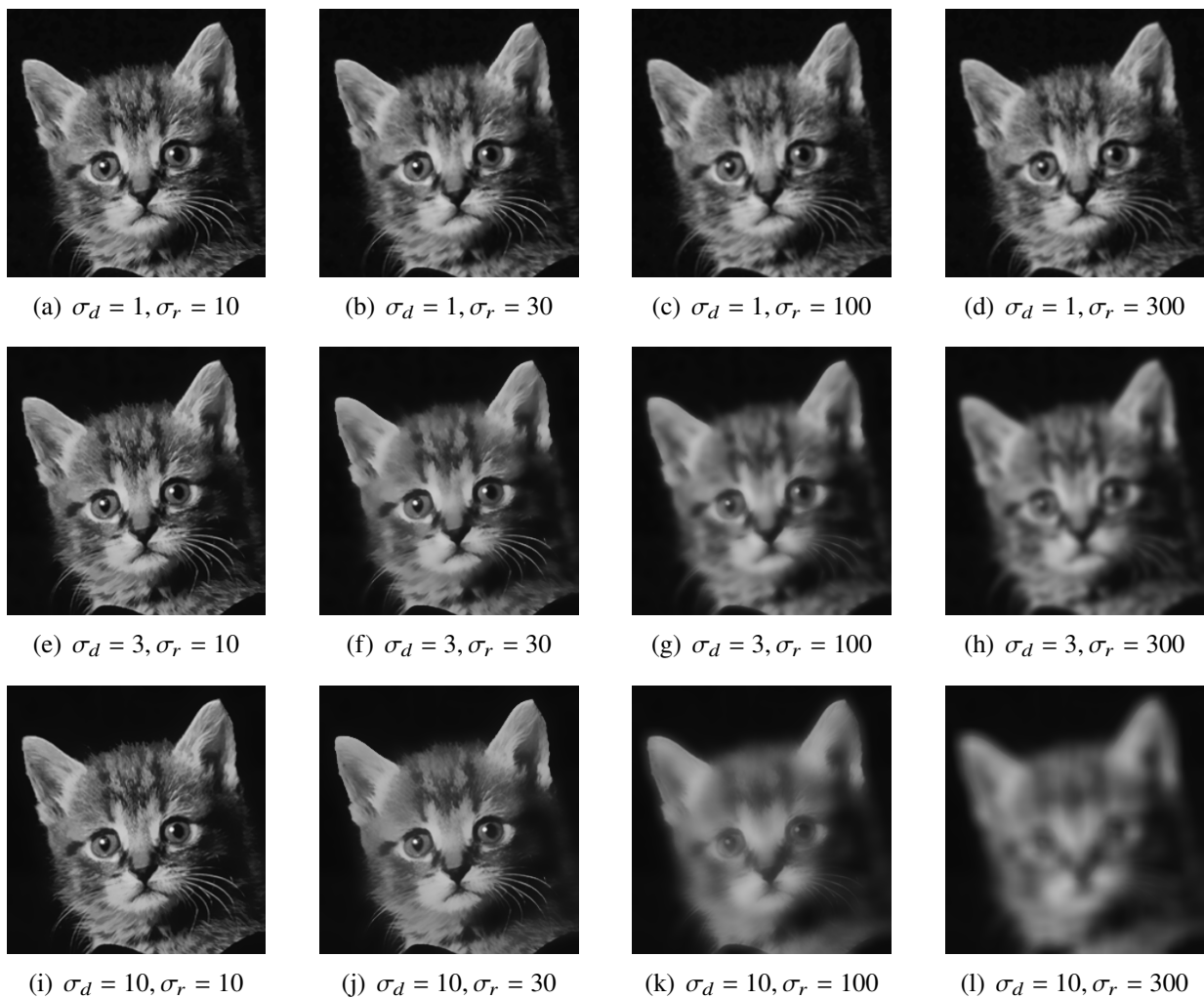


Figure 3: A detail figure with bilateral filters with various range and domain parameter values by re-implement code of cat

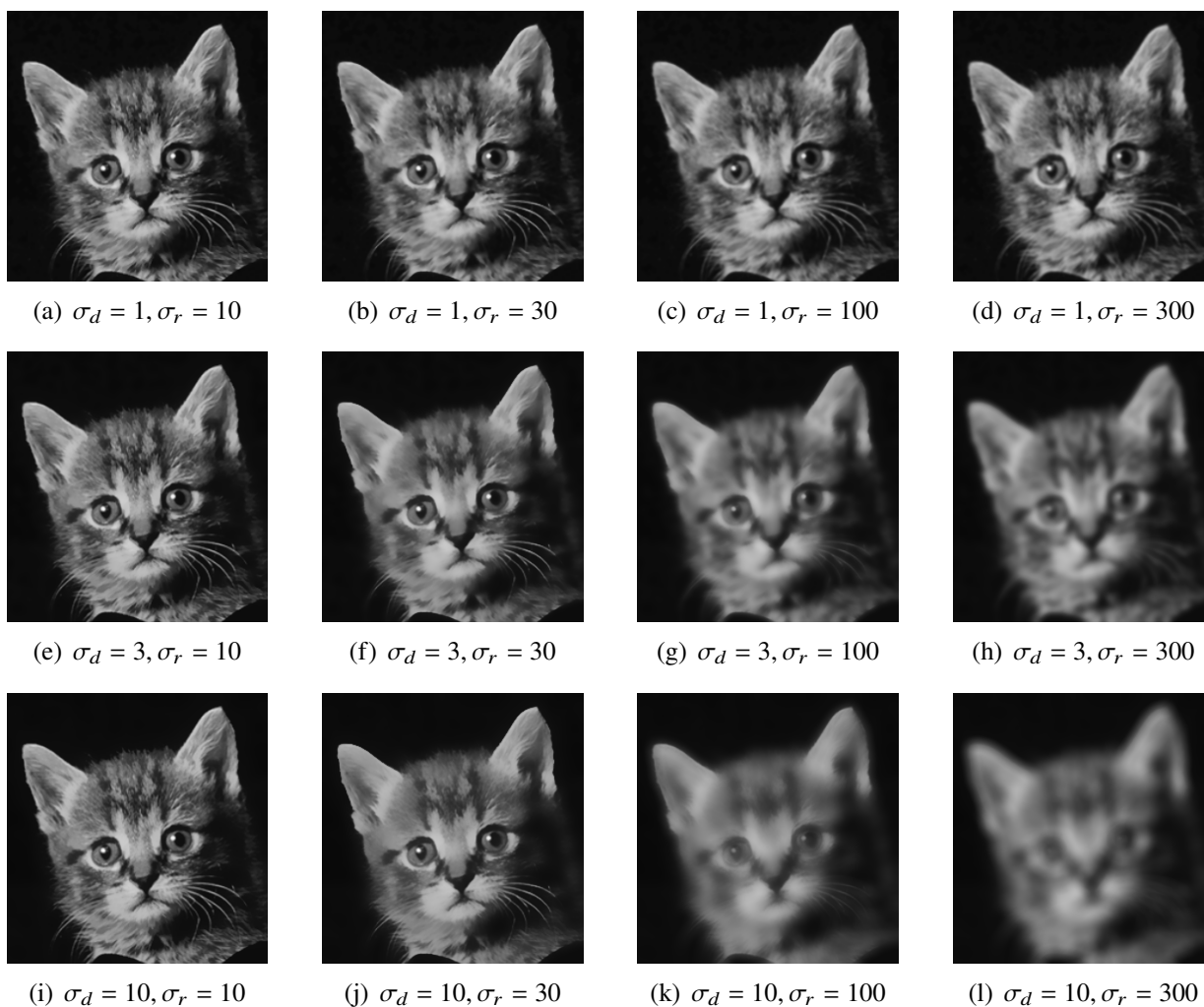
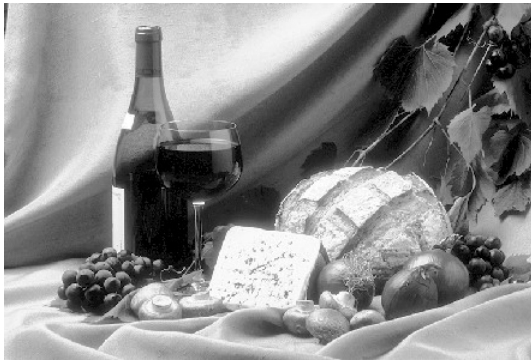


Figure 4: A detail figure with bilateral filters with various range and domain parameter values by Opencv python of cat



(a) $\sigma_d = 1, \sigma_r = 10$



(b) $\sigma_d = 1, \sigma_r = 30$



(c) $\sigma_d = 1, \sigma_r = 100$



(d) $\sigma_d = 1, \sigma_r = 300$

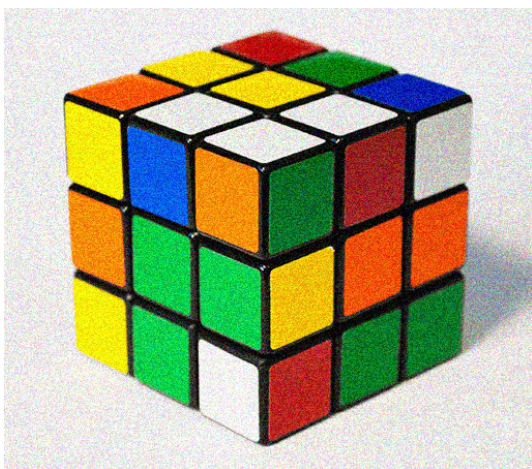
Figure 5: A detail figure with bilateral filters with various range and domain parameter values by OpenCV python of cat



(a) $\sigma_d = 1, \sigma_r = 10$



(b) $\sigma_d = 1, \sigma_r = 30$



(c) $\sigma_d = 1, \sigma_r = 100$



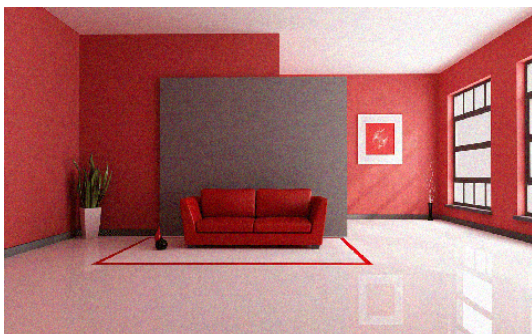
(d) $\sigma_d = 1, \sigma_r = 300$



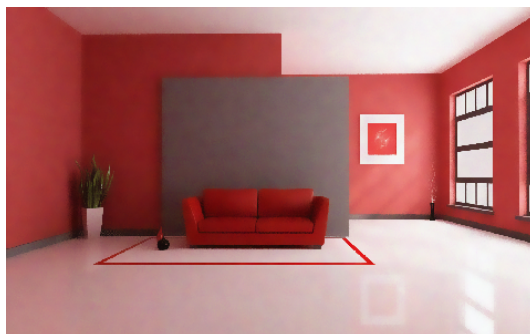
(e) sky



(f) sky code



(g) home



(h) home code

Figure 6: Color images ⁷filtered by Bilateral filter