**Homework2 – Readme**

1.

You can open two pictures (I used image set included runway.jpg as target image and spine.jpg & Degraded\_D.jpg as reference image) and run histogram\_spec\_averages plugin.

**Hint:** You need to select the two reference picture first (open Degraded\_D.jpg then spine.jpg ), then select the target image(runway.jpg), you will see the result on target image**. (Last selected image is the target image !!!!! )**

**Advantage:** this algothism can make pictures captured by same camera

**Disadvantage:** if the pictures have big difference, the effect will be bad.

2.

I set C=2 to do laplacian filter, and I use runway.jpg and spine.jpg for test.

A. (2 points) What value(s) of c give the best‐looking results?

     The best-looking results given by c = 2;

B. (2 points) What happens to the image when the parameter is too high or too low?

     If the parameter is too high or too low the image is going to be over sharpened and the image structure will be changed.

3.

For restore\_img\_a.java,

Type of noise: salt and pepper

 I implement median 3X3 filter to restore Degraded\_A

(reference:  Wilhelm Burger and Mark J. Burge, Digital Image Processing, Springer, 2008).

For restore\_img\_d.java

Type of noise: blurred

Restoration: sharpen Degraded\_A with matrix

**{**{0,c/4,0},

{c/4,1-c,c/4},

{0,c/4,0} and set **c=-7**. (reference: B&B book)

4

1). What value of w gives the most blurring? Explain why

when w = -1 gives the most blurring since when w = -1 the equation I’ = (1+w)\*I-I\*G equal to I’ = I\*G that is Gaussian\_blur.

2) What value of w gives the most sharpening? Explain why

When w = 1 gives the most sharpening since the equation equals to I’ = I+w\*(I-I^). The w\*(i-i^) is the mask to add to I. w is the factor to controls the amount of sharpening. If the w goes higher, the sharpening goes more.

3) Run your filter on any image with the maximal amount of blurring (i.e. the w value from question I and with σ = 10. Now try to reverse this by sharpening the image with the maximal amount of sharpening (the w from question 2) and the same σ = 10.

Did you recover the original image? Why or why not?

No, it can’t recover the original image since what is sharpen did is to emphasize edges in the image. Thus if we blur this image first, the edges will be blurred either result in the edges is hard to find after you blur this image.

4) Run your filter on the image pattern.tif with w = 1 and σ = 10. Describe the artifacts you see in the filtered image. Why does this happen?

This image looks 3D effect, because the plugin find edge and sharpen this object bring out the detail of this image.

**All functions have been realized!**

Tairui Chen