

Digital Image Processing (2023)

Homework 4

{Image Restoration}

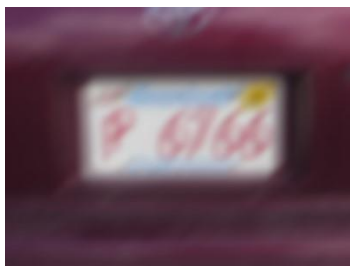
Deadline: 112.12.18

Image Restoration (100%)

Using C++ or C restore the image below. You can use any method you learn from the class or develop your own algorithm. The degradation process of **input1.bmp** and **input2.bmp** is the same, but they will be graded differently.

Gaussian Blur + Motion Blur

Restore input1.bmp to output1.bmp without using image1_ori.bmp. (ex. estimating the degradation function.)



input1.bmp



image1_ori.bmp

You can use all the images to predict the degradation function.



input2.bmp



?

[Input]	input1.bmp	input2.bmp	[Origin]	image1_ori.bmp
[Output]	output1.bmp	output2.bmp		

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Homework Rules and Grading Policy

Homework will be graded by:

1. Performance (60%)

(30%)**output1.bmp** - use PSNR to evaluate your result based on the **image1_ori.bmp**.

PSNR

$$\text{PSNR} = \sum_{k=R,G,B} 10 \log_{10} \left(\frac{255^2}{MSE_k} \right)$$

where (C is the picture)

$$MSE_k = \frac{1}{3mn} \sum_{i=0}^{m-1} \sum_{j=0}^{n-1} \|C_{k,output}(i,j) - C_{k,origin}(i,j)\|^2,$$
$$K = R, G, B$$

(30%)**output2.bmp** – each correctly recognized license plate number is worth one point. You will get at most 30 points.

2. Report (40%)

Do some discussion and explain algorithms in at most 3 pages.

Mark the distinguishable numbers in the report.

Upload:

[web] E3

[File Name] hw4_StudentID.zip (ex: hw4_123456789.zip)

- report in the format of .pdf.
- C, C++ codes with comments.
- ReadMe.txt file which describes how to run your program.
- all output images.

Remind:

Deadline

If you have a late submission by 1 to 7 days, you will only get 70% of the score. We DO NOT accept any late submission after 7 days after the deadline.

Notice:

Cannot use the toolbox, but you can use fft/dft of any library(ex. opencv).