4103026_01 多媒體技術概論

Assignment #2

Due: 11:59pm, 2019/11/18

Image Convolution

Implement the image convolution by Gaussian filter for image smoothing. Assume that there are zero-valued pixels around the edges to ensure the same-size image after image convolution. The following Matlab code creates a Gaussian filter with hsize = [3 3] and sigma = 1. *G = fspecial('gaussian', [3 3], 1);*

(a) Creates the Gaussian filter with hsize = 3x3, 5x5 and 7x7. Apply image convolution to image **柴犬飛飛.jpg** by three Gaussian filters, and compute the PSNR with the original image. [3 image]

(b) Creates the Gaussian filter with sigma = 1, 5 and 10 with hsize = 3x3. Apply image convolution to image **柴犬飛飛.jpg** by three Gaussian filters, and compute the PSNR with the original image. [3 image]

(c) Compare and discuss the results from the above three methods and give the meaning of PSNR values to these results.

(d) Apply Unsharp mask、Edge detection mask to the **柴犬飛飛.jpg**.

$$\begin{bmatrix} -1 & -1 & -1 \\ -1 & 8 & -1 \\ -1 & -1 & -1 \end{bmatrix}$$

Note:
You should not use the MATLAB built-in functions, such as imfilter, conv2, filter2, convn, etc. You are allowed to use ‘psnr‘ provided by Matlab.

Reminder

- MATLAB built-in functions listed in problem description are prohibited.
- Your code should work correctly and the generated results (display or output files) must be consistent to your results in report.
- Report format can be in Word, PowerPoint or others that can clearly describe your work and results. You should convert your report to a PDF file.
- Your report should contain how you implement the methods and discussion about the output results.
- **Pack {student_ID}_report.pdf, the output result images, and codes in {student_ID}.zip. Your package should also contain a README file about how to execute your program.**