Practice 3 Image pre-processing

Questions and Practices

- 1. Intensity Transformation of “Lena.bmp”
  - Contrast enhancement
  - Threshold enhancement
  - Negative enhancement
- PLS refer to Fig.5.1

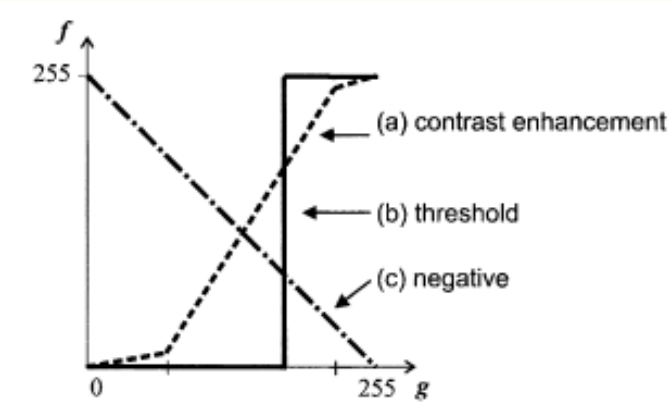


Figure 5.1: Perspective projection geometry examples.

Questions and Practices

- 2. Applying spatial transformations to “Lena.bmp”;

  --rotation, translation, scaling

  --using bilinear interpolation

Questions and Practices

- 3. Histogram equalization of “Lena.bmp”;

Questions and Practices

- 4. Image smoothing and filtering of “Lena.bmp”; PLS refer to Fig.5.10

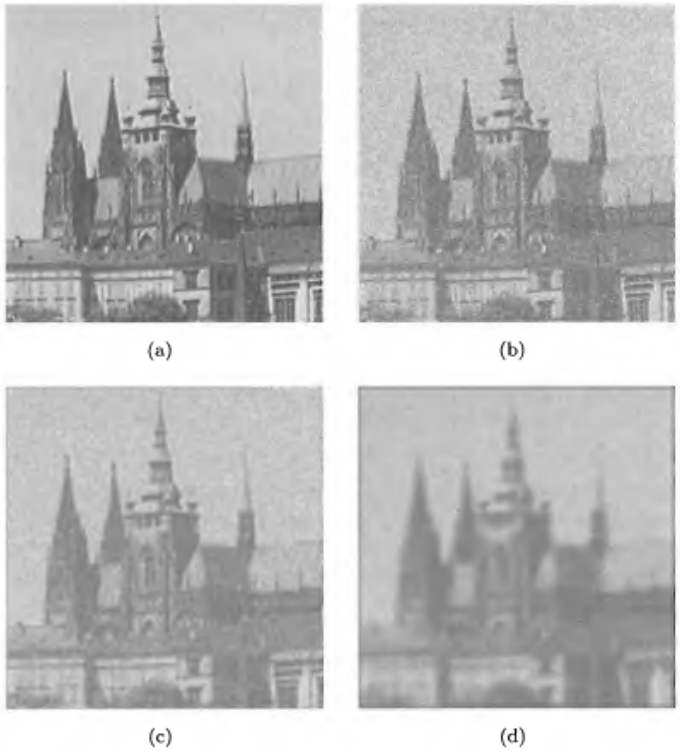
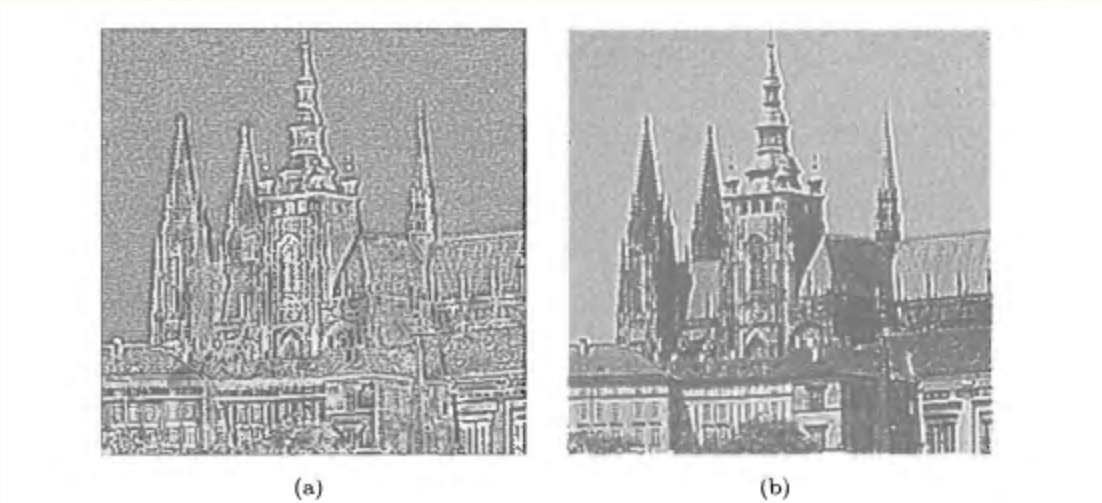


Figure 5.10: Noise with Gaussian distribution and averaging filters. (a) Original image. (b) Superimposed noise (random Gaussian noise characterized by zero mean and standard deviation equal to one-half of the gray-level standard deviation of the original image). (c) 3×3 averaging. (d) 7×7 averaging.

Questions and Practices

- 5. Image Sharpening of “Lena.bmp”, using Laplacian operator, PLS refer to Fig.5.20



(a) (b)

Figure 5.20: Laplace gradient operator. (a) Laplace edge image using the 8-connectivity mask. (b) Sharpening using the Laplace operator (equation (5.35), $C = 0.7$). Compare the sharpening effect with the original image in Figure 5.10a.

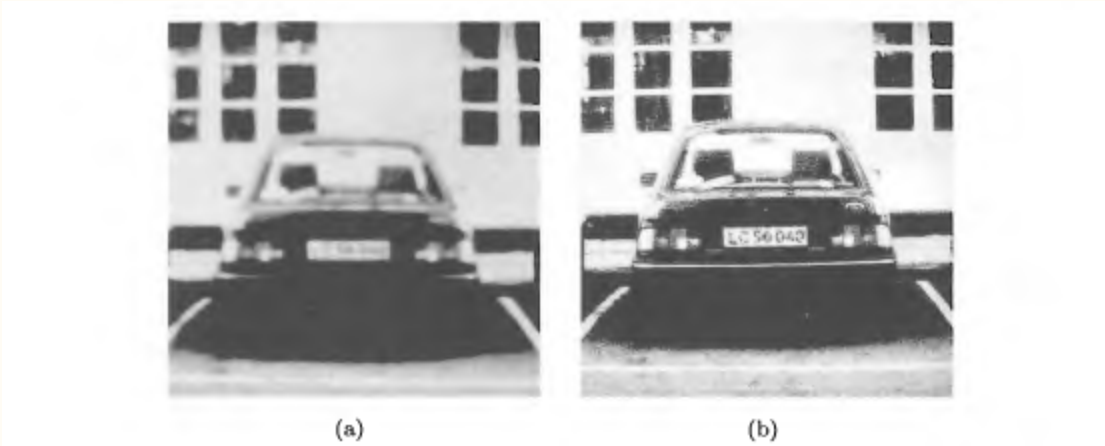
Questions and Practices

- 6. Restoration of “LENA.bmp” using Wiener filtering.

  1)Modeling the degradation function by yourself.

  2)PLS refer to "digital image processing using Matlab“, Page166

  3)PLS refer to Fig.5.40



(a) (b)

Figure 5.40: Restoration of wrong focus blur using Wiener filtration. *Courtesy of P. Kohout, Criminalistic Institute, Prague.*