Lab2
histogram equalization and filtering

Jinyu Yang

Outline

- histogram equalization
- Gaussian filtering
- Sobel filtering
- Image pyramid

histogram equalization

$$s_k = T(r_k) = (L-1)\sum_{j=0}^{k} P_r(r_j) = \frac{L-1}{MN}\sum_{j=0}^{k} n_j \qquad k = 1, 2, 3 \ldots L-1$$

s_k：目标像素值

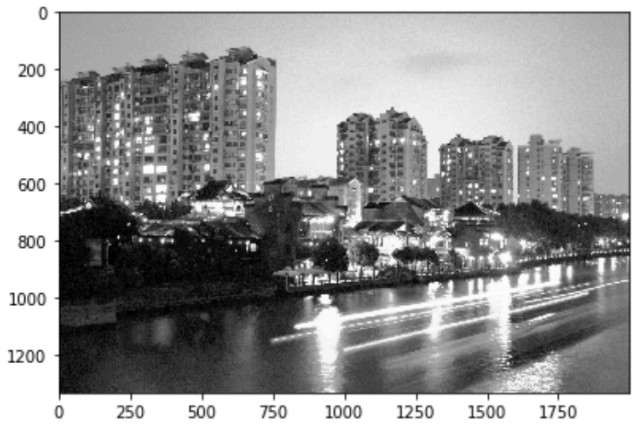
r_k：原始像素值

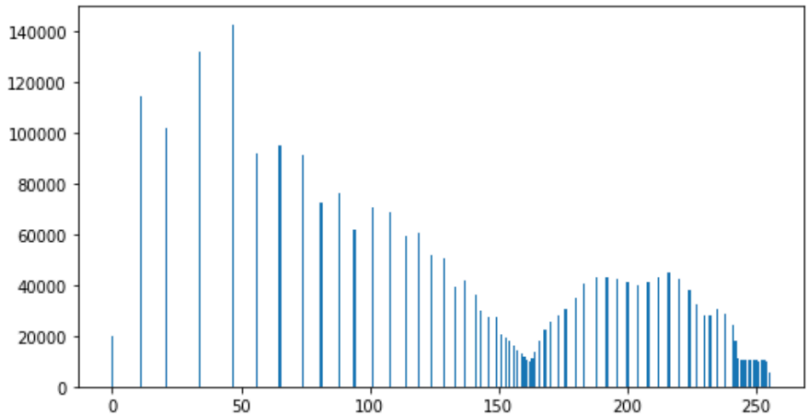
L：灰度级（8位256）

$P_r(r_j)$：r_j在原始图中的概率

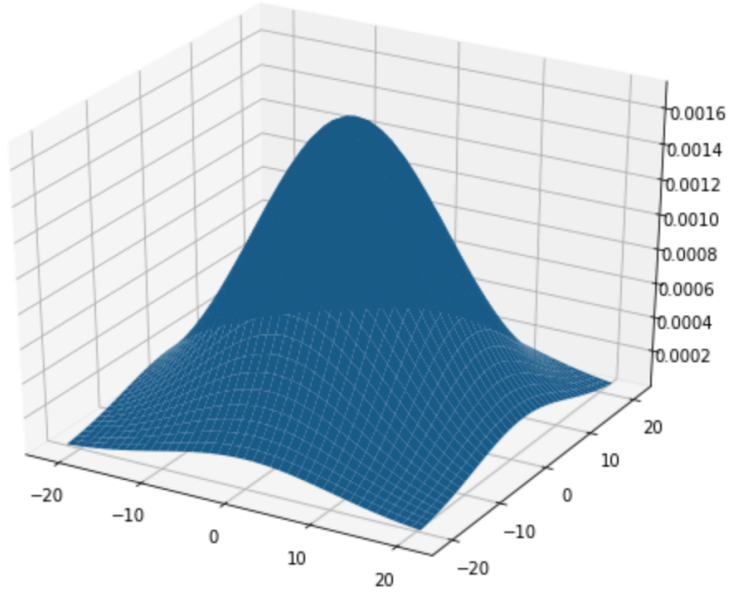
MN：图像的像素总数cols×rows

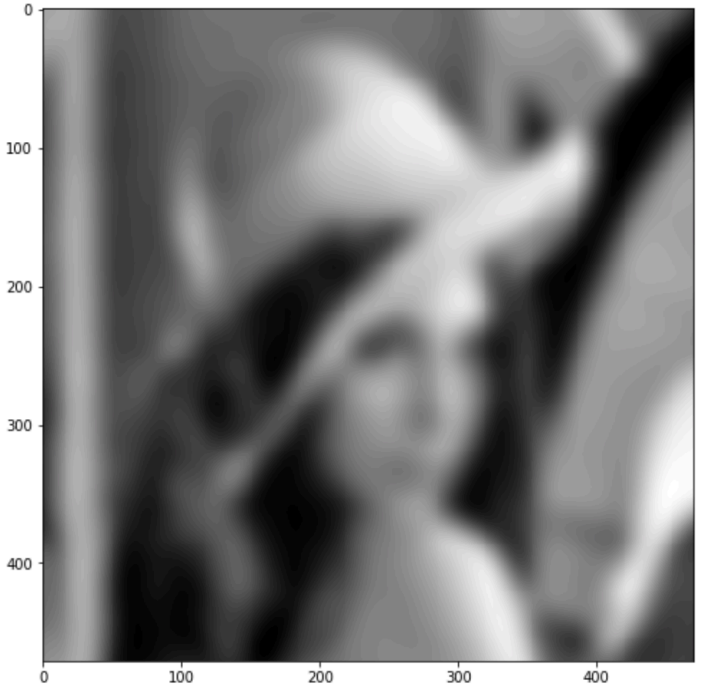
n_j：原始图像中，像素值为 j 的个数





Gaussian filtering





Sobel filtering

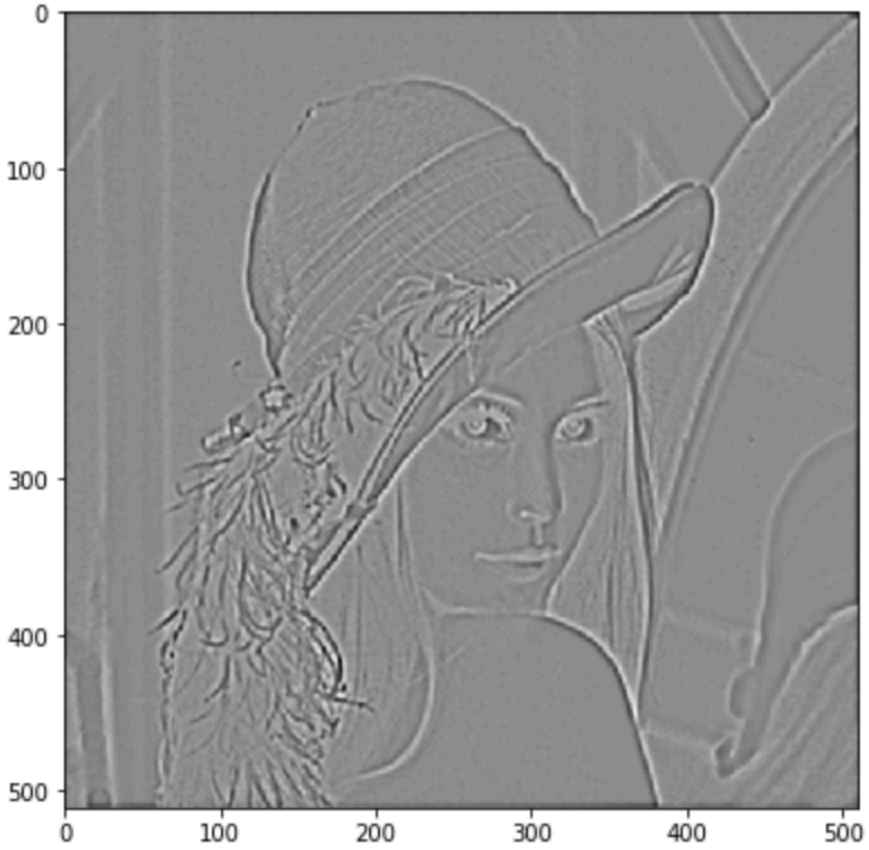
$$\begin{bmatrix} 1 & 2 & 1 \\ 0 & 0 & 0 \\ -1 & -2 & -1 \end{bmatrix}$$

纵向算子，提取图像水平边缘 ↑

$$\begin{bmatrix} 1 & 0 & -1 \\ 2 & 0 & -2 \\ 1 & 0 & -1 \end{bmatrix}$$

横向算子，提取图像竖直边缘 ↑

Image pyramid



Larger kernel std