智能医学数字图像处理实验报告

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| 实验  名称 | 实验5：图像频域增强 | | |
| 实验  目的  和  内容 | **实验目的和要求：**  掌握评语滤波的常用滤波器原理和方法  **实验内容：**  Python实现频域滤波的常用滤波器，并分析不同截止频率对不同滤波器的频域增强效果 | | |
| 实验  结果  与  分析 | 1. 原图 2. 灰度图 3. fshift[crow - 30:crow + 30, ccol - 30:ccol + 30] = 0 高通滤波 4. fshift[crow - 1:crow + 1, ccol - 1:ccol + 1] = 0 高通滤波 5. mask[crow - 30:crow + 30, ccol - 30:ccol + 30] = 1 低通滤波 6. mask[crow - 1:crow + 1, ccol - 1:ccol + 1] = 1 低通滤波 | | |
| 实验  代码 | import cv2 import numpy as np  if \_\_name\_\_ == '\_\_main\_\_':  img = cv2.imread('./Lena.png')  cv2.imwrite('./out/origin.png', img)  # need gray image  gray\_img = cv2.cvtColor(img, cv2.COLOR\_RGB2GRAY)  cv2.imwrite('./out/gray\_img.png', gray\_img)  # high-pass filter 30  f = np.fft.fft2(gray\_img)  fshift = np.fft.fftshift(f)   rows, cols = gray\_img.shape  crow, ccol = int(rows / 2), int(cols / 2)  fshift[crow - 30:crow + 30, ccol - 30:ccol + 30] = 0  ishift = np.fft.ifftshift(fshift)  iimg = np.abs(np.fft.ifft2(ishift))  cv2.imwrite('./out/hp\_30.png', iimg)   # high-pass filter 1  f = np.fft.fft2(gray\_img)  fshift = np.fft.fftshift(f)   rows, cols = gray\_img.shape  crow, ccol = int(rows / 2), int(cols / 2)  fshift[crow - 1:crow + 1, ccol - 1:ccol + 1] = 0  ishift = np.fft.ifftshift(fshift)  iimg = np.abs(np.fft.ifft2(ishift))  cv2.imwrite('./out/hp\_1.png', iimg)   # low-pass filter 30  dft = cv2.dft(np.float32(gray\_img), flags=cv2.DFT\_COMPLEX\_OUTPUT)  fshift = np.fft.fftshift(dft)   rows, cols = gray\_img.shape  crow, ccol = int(rows / 2), int(cols / 2)  mask = np.zeros((rows, cols, 2), np.uint8)  mask[crow - 30:crow + 30, ccol - 30:ccol + 30] = 1  fi = fshift \* mask  ishift = np.fft.ifftshift(fi)  iimg = cv2.idft(ishift)  res = cv2.magnitude(iimg[:, :, 0], iimg[:, :, 1])  cv2.imwrite('./out/lp\_30.png', res)   # low-pass filter 1  dft = cv2.dft(np.float32(gray\_img), flags=cv2.DFT\_COMPLEX\_OUTPUT)  fshift = np.fft.fftshift(dft)   rows, cols = gray\_img.shape  crow, ccol = int(rows / 2), int(cols / 2) # 中心位置  mask = np.zeros((rows, cols, 2), np.uint8)  mask[crow - 1:crow + 1, ccol - 1:ccol + 1] = 1  fi = fshift \* mask  ishift = np.fft.ifftshift(fi)  iimg = cv2.idft(ishift)  res = cv2.magnitude(iimg[:, :, 0], iimg[:, :, 1])  cv2.imwrite('./out/lp\_1.png', res) | | |
| 成绩  评定 | 教师签名：  年 月 日 | | |