智能医学数字图像处理实验报告

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| 实验  名称 | 实验1：数字图像基本操作 | | |
| 实验  目的  和  内容 | 实验目的和要求：  1.掌握Anaconda中搭建课程实验环境的⽅法；  2.掌握读、写图像的基本⽅法；  3.掌握python语⾔中图像数据与信息的读取⽅法；  4.掌握图像基本属性的操作⽅法；  5.掌握图像的简单运算⽅法；  实验内容：  1.使⽤Anaconda搭建课程实验环境。  2.实现图像模拟采样的代码。  3.实现图像量化的代码。  4.实现图像算术运算的代码。  5.实现图像点运算的代码。 | | |
| 实验  结果  与  分析 | 1. 环境配置 2. 图像处理   原图：  （1）图像采样  （2）图像量化  （4）算术运算    （5）点运算 | | |
| 实验  代码 | import cv2  import numpy as np  def sampling(read\_file, digits, out\_dir, out\_name):  img = cv2.imread(read\_file)  msg = out\_dir + 'sampling\_origin.png'  cv2.imwrite(msg, img)  height = img.shape[0]  width = img.shape[1]  height\_dig = int(height / digits)  width\_dig = int(width / digits)  new\_img = np.zeros((height, width, 3), np.uint8)  for i in range(digits):  y = i \* height\_dig  for j in range(digits):  x = j \* width\_dig  b = img[y, x][0]  g = img[y, x][1]  r = img[y, x][2]  for n in range(height\_dig):  for m in range(width\_dig):  new\_img[y + n, x + m][0] = np.uint8(b)  new\_img[y + n, x + m][1] = np.uint8(g)  new\_img[y + n, x + m][2] = np.uint8(r)  msg = out\_dir + out\_name  cv2.imwrite(msg, new\_img)  return new\_img  def quantize(read\_file, out\_dir, out\_name):  img = cv2.imread(read\_file)  msg = out\_dir + 'quantize\_origin.png'  cv2.imwrite(msg, img)  new\_img = np.zeros(  (  img.shape[0],  img.shape[1],  3  ),  np.uint8  )  # quantization  for i in range(img.shape[0]):  for j in range(img.shape[1]):  for k in range(3):  if img[i, j][k] < 128:  gray = 0  else:  gray = 128  new\_img[i, j][k] = np.uint8(gray)  msg = out\_dir + out\_name  cv2.imwrite(msg, new\_img)  return new\_img  def dim\_pic(read\_file, dim\_point, out\_dir, out\_name):  img = cv2.imread(read\_file)  msg = out\_dir + 'dime\_origin.png'  cv2.imwrite(msg, img)    new\_img = cv2.subtract(  img,  np.ones(img.shape, dtype='uint8')\*dim\_point  )    msg = out\_dir + out\_name  cv2.imwrite(msg, new\_img)  return new\_img    if \_\_name\_\_ == '\_\_main\_\_':  org\_pic = './flower.png'  out\_dir = './out/'  sampled = sampling(org\_pic, 16, out\_dir, 'sampled.png')  quantized = quantize(org\_pic, out\_dir, 'quantized.png')  dim = dim\_pic(org\_pic, 50, out\_dir, 'dim.png')  # change pixel  cv2.imshow("sampled", sampled)  cv2.imshow("quantize", quantized)  cv2.imshow("dim", dim)  cv2.waitKey(0)  img = cv2.imread(org\_pic)  test = img[88, 142]  print('read:', test)  img[88, 142] = [255, 255, 255]  print('changed:', test) | | |
| 成绩  评定 | 教师签名：  年 月 日 | | |