

Course: 概率论

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**Problem 8**

思考题: 你能否写一个程序, 利用实现最基本的图像锐化和平滑的功能?

*Solution:*

如图所示, 左侧为一张有大量噪点的猫照片, 右图为经过平滑处理的图像, 可见噪点明显减少



具体代码如下所示, 先读入需被平滑的图片并且进行预处理

```
1 import cv2
2 import numpy as np
3 IMG = cv2.imread("kitten.png")
4 Height, Width, Center = IMG.shape
```

设置核为  $3 \times 3$

```
1 Kernal_size = 3
2 padding = Kernal_size // 2
3 out_put = np.zeros((Height + padding * 2, Width + padding * 2, Center), dtype=np.float)
4 out_put[padding:padding + Height, padding:padding + Width] = IMG.copy().astype(np.float)
5 tmp = out_put.copy()
```

进行图像平滑

```
1 #SMOOTHING
2 for pixel_y in range(Height):
3     for pixel_x in range(Width):
4         for center in range(Center):
5             out_put[padding + pixel_y, padding + pixel_x, center] = np.median(tmp[pixel_y:pixel_y +
6                 Kernal_size, pixel_x:pixel_x + Kernal_size, center])
6 # END OF SMOOTHING
```

输出结果

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```
1 out_put = out_put[padding:padding + Height, padding:padding + Width].astype(np.uint8)
2 cv2.imwrite("after_smooth.jpg", out_put)
```

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