

Computer Vision — Homework 6

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1 Yokoi connectivity number

先將原圖 lena.bmp 做 binarize，再把原本 512 x 512 大小的 binary[][]，以 8 x 8 為一單位，拿最左上的 pixel 作為 downsample 的 data，最後成為 down[][]。

Source Code

```
33 for i in range(down_rows):
34     for j in range(down_cols):
35         x0, x1, x2, x3, x4, x5, x6, x7, x8 = [0] * 9
36         if down[i][j] != 0:
37             x0 = down[i][j]
38             if i - 1 >= 0:
39                 x2 = down[i - 1][j]
40                 if j - 1 >= 0:
41                     x7 = down[i - 1][j - 1]
42                 if j + 1 < down_cols:
43                     x6 = down[i - 1][j + 1]
44             if i + 1 < down_rows:
45                 x4 = down[i + 1][j]
46                 if j - 1 >= 0:
47                     x8 = down[i + 1][j - 1]
48                 if j + 1 < down_cols:
49                     x5 = down[i + 1][j + 1]
50             if j - 1 >= 0:
51                 x3 = down[i][j - 1]
52             if j + 1 < down_cols:
53                 x1 = down[i][j + 1]
54             count = [h(x0, x1, x6, x2), h(x0, x2, x7, x3), h(x0, x3, x8, x4), h(x0, x4, x5, x1)]
55             temp = count.count('q')
56             yokoi[i][j] = temp
57             if count.count('r') == 4:
58                 yokoi[i][j] = 5
59         if j == down_cols - 1:
60             end = '\n'
61         else: end = ' '
62         if yokoi[i][j] == 0:
63             print(' ', end = end, file = data)
64         else: print(yokoi[i][j], end = end, file = data)
```

LINE 36-54: Go through all the pixels in down[][]. When the pixel is white, this pixel is x_0 , and the other pixels around it are $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8$.

LINE 55-58: See how many 'q' for each pixel. The number of 'q' is Yokoi connectivity number for the pixel. However, if the list for the pixel is [r, r, r, r], its Yokoi connectivity number is 5.

```

4  def h(b, c, d, e):
5      if b != c:
6          return 's'
7      if d == b and e == b:
8          return 'r'
9      return 'q'

```

This function is to judge which one to input, 's', 'r' or 'q'.

結果圖



Figure 1: Yokoi Connectivity Number