

# Computer Vision HW7 Report

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## Step 1: Yokoi Connectivity Nuber (hw6)

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## Step 2: PairRelationshipOperator

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## Pair Relationship Operator

➤ H function: ( $m = \text{"1"}$ , means **"edge"** in Yokoi)

- $$h(a, m) = \begin{cases} 1, & \text{if } a = m \\ 0, & \text{otherwise} \end{cases}$$

➤ Output:

- $$y = \begin{cases} q, & \text{if } \sum_{n=1}^4 h(x_n, m) < 1 \text{ or } x_0 \neq m \\ p, & \text{if } \sum_{n=1}^4 h(x_n, m) \geq 1 \text{ and } x_0 = m \end{cases}$$

```

def PairRelationshipOperator(img):
    table=np.zeros((66,66),dtype=np.int32)
    table[1:65,1:65]=img
    for i in range(1,65):
        for j in range(1,65):
            if table[i][j] == 0:
                img[i-1][j-1] = 0
            elif table[i][j] == 1:
                if table[i][j+1] == 1 or table[i-1][j] == 1 or table[i][j-1] == 1 or table[i+1]
[j] == 1:
                    img[i-1][j-1] = 1
                else:
                    img[i-1][j-1] = 2
            else:
                img[i-1][j-1] = 2
    return img

```

## Step 3: ConnectedShrinkingOperator (Remove pixel whose yokoi is 1)

將原圖與 pairelationship operation 後(mask)被標為'p'之pixel挑出。如果在原圖中與mask中皆可被remove則將該pixel去除。這裡是recursive operator，一直做到output和input相同時結束。

Result:

