homework-6

Homework 6

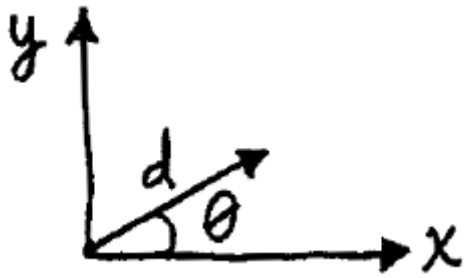
Problem Description | Texture Analysis

In the following image, where each pixel is represented as a 2-bit grayscale value. The pixel values are undefined outside the region (no padding; not zero).

(a) Calculate the gray-level-co-occurrence matrix, sym.
$C_{45^\circ,1.414}$

(b) Calculate the gray-level-co-occurrence matrix, asym.
$C_{90^\circ,1}$

$$\begin{bmatrix} 2 & 2 & 1 & 2 & 3 \\ 0 & 0 & 2 & 0 & 3 \\ 1 & 1 & 2 & 1 & 0 \\ 3 & 1 & 3 & 3 & 2 \\ 2 & 3 & 3 & 1 & 0 \end{bmatrix}$$



Part A | Calculate the gray-level-co-occurrence matrix, sym.

(a) Calculate the gray-level-co-occurrence matrix, sym.
$C_{45^\circ,1.414}$

Given $\begin{bmatrix} 2 & 2 & 1 & 2 & 3 \\ 0 & 0 & 2 & 0 & 3 \\ 1 & 1 & 2 & 1 & 0 \\ 3 & 1 & 3 & 3 & 2 \\ 2 & 3 & 3 & 1 & 0 \end{bmatrix}$

Calculate

asym. $C_{45^\circ,1.414} = \begin{matrix} \frac{a}{b} & 0 & 1 & 2 & 3 \\ 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 0 \\ 2 & 0 & 0 & 1 & 1 \\ 3 & 1 & 1 & 1 & 1 \end{matrix}$

Similarity calculating

asym. $C_{-45^\circ,1.414} = \begin{matrix} \frac{a}{b} & 0 & 1 & 2 & 3 \\ 0 & 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 \\ 2 & 0 & 1 & 1 & 1 \\ 3 & 0 & 0 & 1 & 1 \end{matrix}$

Therefore,

sym $C_{45^\circ,1.414} = \begin{bmatrix} \frac{a}{b} & 0 & 1 & 2 & 3 \\ 0 & 0 & 1 & 0 & 1 \\ 1 & 1 & 2 & 1 & 1 \\ 2 & 0 & 1 & 2 & 2 \\ 3 & 1 & 1 & 2 & 2 \end{bmatrix}$

Part B | Calculate the gray-level-co-occurrence matrix, asym.

Given $\begin{bmatrix} 2 & 2 & 1 & 2 & 3 \\ 0 & 0 & 2 & 0 & 3 \\ 1 & 1 & 2 & 1 & 0 \\ 3 & 1 & 3 & 3 & 2 \\ 2 & 3 & 3 & 1 & 0 \end{bmatrix}$

We can calulate the gray-level-co-occurrence matrix as follows:

$$C_{90^\circ,1} = \begin{bmatrix} \frac{a}{b} & 0 & 1 & 2 & 3 \\ 0 & 1 & 0 & 4 & 1 \\ 1 & 3 & 1 & 0 & 1 \\ 2 & 1 & 1 & 1 & 1 \\ 3 & 0 & 3 & 1 & 2 \end{bmatrix}$$