

1.1 Exercises

1.1.1 Exercise

a.

Give an example of two texture patterns, where first order statistics will not differentiate the textures.

Solution

0	3	0	3	0	0	0	0
0	3	0	3	3	3	3	3
0	3	0	3	0	0	0	0
0	3	0	3	3	3	3	3
0	3	0	3	0	0	0	0
0	3	0	3	3	3	3	3
0	3	0	3	0	0	0	0
0	3	0	3	3	3	3	3

b.

For the given data, compute the gray level cooccurrence matrix $s(i,j,d)$ where $d = (2,0)$.

1	3	2	0	0	2	3	1
1	3	2	0	0	2	3	1
1	3	2	0	0	2	3	1
1	3	2	0	0	2	3	1
0	2	1	0	0	2	1	0
0	2	1	0	0	2	1	0
0	2	1	0	0	2	1	0
0	2	1	0	0	2	1	0

Solution.

		j			
		0	1	2	3
i	0	0	8	8	4
	1	4	0	4	0
	2	12	4	0	0
	3	4	0	0	0

the total number of transitions is 48

c.

Write the equations for the contrast and symmetry measures.

What texture properties do they measure?

Compute the symmetry measure for distance d from part b.

Solution.

The symmetry measure characterizes the symmetry of a texture pattern. It is zero or low value in a direction of symmetry.

$$C = \sum_i \sum_j (i-j)^2 s(i, j, d, R)$$

$$U = \sum_i \sum_j |s(i, j, d, R) - s(j, i, d, R)|$$

$$U = (4 + 4 + 4 + 4)/48$$

$$U = .3333$$

