

Exercise 2 - Image characteristics (6.November.2017 16h-17h)

1. A small part of the image was selected and it is represented by the following values:

1	1	5	6
2	3	5	7
4	5	7	1
8	5	1	2

- a) What is the distance between the two pixels, which have gray level 2, according to the:

1. Euclidean metric

Euclidean :

$$d(x,y)=\sqrt{\sum_{i=1}^m (x_i-y_i)^2}$$

2. City Block metric

Manhattan / city - block :

$$d(x, y) = \sum_{i=1}^m |x_i - y_i|$$

3. Chebychev metric

Chebyshev :

$$d(x, y) = \max_{i=1}^m |x_i - y_i|$$

- What are the 4 closest neighbors of value 3? And the 8 closest neighbors?
- If a neighbourhood in 3D is defined as Euclidean distance lower or equal to one, which neighbours do we have? What about two?

Please use Matlab to calculate now a), b) and c).

- d) Draw the histogram of this image (use 8 bins for the histogram).
- e) Draw the histogram with 4 bins.
- f) Calculate the mean and variance (mean square deviation) of this image:
 - 1. Using just the image
 - 2. Using just the histogram
- g) Calculate the entropy and anisotropy coefficient of this image.
- h) Calculate the co-occurrence matrix of this image (using 8 gray levels) - with the right neighbour

[illegible]