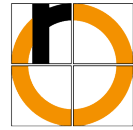


A2I2 – Basic Image Processing Exercise

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Filter

- The following values represent a row of pixels of a grayscale image:

1, 0, 2, 2, 2, 8, 2, 3, 6, 6, 6

Compute the convolution (filter) of this image row using a 1D filter mask:

- mask $\frac{1}{3} [1 \ 1 \ 1]$ $\times_1 1, \frac{4}{3} = 1, 2, 4, 4, \frac{11}{3} = 4, \frac{11}{3} = 4, 5, 6, \times$
- mask $[1 \ 0 \ -1]$ $\times_1 1, 2, 0, 6, 0, -5, 4, 3, 0, \times$
- use a 1x3 sized Median filter $\times_1 1, 2, 2, 2, 2, 3, 3, 6, 6, \times$

- The following table shows a small grayscale image. Filter the image and fill in the result in the empty tables below.

1	1	4	4
1	1	4	4
1	1	4	4
1	1	4	4

- apply a 3x3 mean filter

	2	3	
	2	3	

- apply a 3x3 Median

	1	4	
	1	4	

3. The following table shows a small grayscale image. Filter the image and fill in the result in the empty tables below.

b

1	1	1	1	4	4	4	4
1	1	1	1	4	4	4	4
1	1	1	1	4	4	4	4
1	1	1	1	4	4	4	4
1	1	1	1	4	4	4	4
1	1	1	1	4	4	4	4

$\rightarrow \sum a \cdot b$

pixeln

- a. apply a 3x3 Sobel (derivative in x-direction)

$$\begin{pmatrix} 1 & 0 & -1 \\ 2 & 0 & -2 \\ 1 & 0 & -1 \end{pmatrix}^a$$

	0	0	12	12	0	0	
	0	0	12	12	0	0	
	0	0	12	12	0	0	
	0	0	12	12	0	0	

- b. apply a 3x3 Sobel (derivative in y-direction)

	0	0	0	0	0	0	
	0	0	0	0	0	0	
	0	0	0	0	0	0	
	0	0	0	0	0	0	