Computer vision, pattern recognition and image retrieval

Laboratory 3

Topic: *Filtration of digital images*

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Technical support for Matlab is available on the website: http://www.mathworks.com/

In Lab 03, you need to make a simple application in a graphical user interface. Application development should be done in the same way as in laboratory 2. The next tasks are the next operations of image transformation.

Exercise 1

Please create a new application "Lab03". There should be 10 Button objects and 6 Axes objects on the form. The first "Close" button should close the form. The second "Open" button should read a color image (type .jpg, .png, .bmp) from the selected file and display it in Axes. (Lab02 has detailed instructions on how to do this).

Exercise 2

In the third button, "Noise S&P", please program the operation of the loaded image to be noisy with the "salt & pepper" type noise. The noisy image should be global and should be displayed in Axes2.

Required commands:

imnoise - introducing noise in the image

Exercise 3

In the fourth "Noise Gauss" button, program the operation of noise operation of the loaded original image with the „gaussian" noise. The noisy image should be global and should be displayed in Axes3.

Required commands:

imnoise - introducing noise in the image

Exercise 4

In the fifth "Average" button, program the filtering operation of three color images (loaded original, noisy "salt & pepper", noisy "gaussian"). Please use an averaging filter.

Axes4 should display the original image after average filtration.

Axes5 should display a noisy "salt & pepper" image after average filtration.

Axes6 should display a noisy "gaussian" image after averaging filtration.

Required commands:

fspecial - creates a mask of the selected filter (e.g. average, gaussian, prewitt, sobel, laplacian, log, ...)
imfilter - performs the image-mask convolution operation

Exercise 5

In the next button " Gaussian ", program the filtering operation of three color images (loaded original, noisy "salt & pepper", noisy "gaussian"). Please use the "gaussian" mask filter.

Axes4 should display the original image after convolution with the "gaussian" filter.

Axes5 should display a noisy "salt & pepper" image after convolution with the "gaussian" filter.

Axes6 should display a noisy "gaussian" image after convolution with the "gaussian" filter.

Required commands:

fspecial - creates a mask of the selected filter (e.g. average, gaussian, prewitt, sobel, laplacian, log, ...)
imfilter - performs the image-mask convolution operation

Exercise 6

In the next button " Prewitt ", program the filtering operation of three color images (loaded original, noisy "salt & pepper", noisy "gaussian"). Please use the "prewitt" mask filter.

Axes4 should display the original image after convolution with the "prewitt" filter.

Axes5 should display a noisy "salt & pepper" image after convolution with the "prewitt" filter.

Axes6 should display a noisy "gaussian" image after convolution with the "prewitt" filter.

Required commands:

fspecial - creates a mask of the selected filter (e.g. average, gaussian, prewitt, sobel, laplacian, log, ...)
imfilter - performs the image-mask convolution operation

Exercise 7

In the next button " Sobel ", program the filtering operation of three color images (loaded original, noisy "salt & pepper", noisy "gaussian"). Please use the "sobel" mask filter.

Axes4 should display the original image after convolution with the "sobel" filter.

Axes5 should display a noisy "salt & pepper" image after convolution with the "sobel" filter.

Axes6 should display a noisy "gaussian" image after convolution with the "sobel" filter.

Required commands:

fspecial - creates a mask of the selected filter (e.g. average, gaussian, prewitt, sobel, laplacian, log, ...)
imfilter - performs the image-mask convolution operation

Exercise 8

In the next button " Laplacian ", program the filtering operation of three color images (loaded original, noisy "salt & pepper", noisy "gaussian"). Please use the "laplacian" mask filter.

Axes4 should display the original image after convolution with the "laplacian" filter.

Axes5 should display a noisy "salt & pepper" image after convolution with the "laplacian" filter.

Axes6 should display a noisy "gaussian" image after convolution with the "laplacian" filter.

Required commands:

fspecial - creates a mask of the selected filter (e.g. average, gaussian, prewitt, sobel, laplacian, log, ...)
imfilter - performs the image-mask convolution operation

Exercise 9

In the next button " Log ", program the filtering operation of three color images (loaded original, noisy "salt & pepper", noisy "gaussian"). Please use the "log" mask filter.

Axes4 should display the original image after convolution with the "log" filter.

Axes5 should display a noisy "salt & pepper" image after convolution with the "log" filter.

Axes6 should display a noisy "gaussian" image after convolution with the "log" filter.

Required commands:

fspecial - creates a mask of the selected filter (e.g. average, gaussian, prewitt, sobel, laplacian, log, ...)
imfilter - performs the image-mask convolution operation

Please send only the „Lab03.mlapp" file to the moodle platform as an answer.

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