

Image restoration and color image processing

Exercises in Matlab

1. Take the image *rose.tif* and add to it noise:

- 1) Gaussian;
- 2) salt and pepper.

Use function `imnoise` to add noise.

Visualize:

- 1) the initial image;
- 2) image corrupted by the Gaussian noise;
- 3) image corrupted by salt & pepper noise.

2. Add Gaussian noise to the image *rose.tif*. Select a region of interest on the image with added noise, visualize the histogram for this region. Use functions `roipoly` and `imhist`.

Visualize the following:

- 1) the initial image;
- 2) the image with noise;
- 3) the binary image obtained by using `roipoly`;
- 4) the histogram of the chosen region.

3. Take the image *chip.tif* and add to it salt & pepper noise with density 0.3.

Perform image restoration using different window sizes of median filter and different maximal window sizes for the adaptive median filter (use function `adpmedian`).

Visualize the best results for both filters: median and adaptive median.

Answer the questions:

- 1) what is the effect of (maximal) window size on the filtering result?
- 2) which filter would you prefer – median or adaptive median? why?

4. Display the image *rose.tif* with 3 different colormaps predefined in Matlab. Use the functions `imshow` and `colormap`.

5. Perform smoothing of the image *endorphin1.jpg* by using the averaging filter in function `imfilter` (first define mask 7×7 using `fspecial`). Visualize the result.