

Exercise 3: Spatial filtering

Spatial filtering is an image processing technique that modulates the intensity of a pixel-based on its neighbors' brightness.

It can be used to eliminate background noise, sharpen edges, and adjust the illumination.

In this practice, we will learn how to employ a basic spatial filtering strategy.

Exercise goal:

- Understand how to use simple spatial filtering algorithms.
- Examine the effects of various filter kernels/masks.
- **Task 1:**
 - Image smoothing using correlations
 - To smooth out the provided image ([test03.jpg](#)) apply a 3×3 filter mask. Remember to pad the input image with zeros before smoothing.
(MATLAB functions: `imfilter()`, `padarray(x, [2 2])`)
 - You can also experiment with filter masks of various sizes (e.g., 5*5, 10*10, etc.) to see how different filters affect the image

Put the generated images in the report and explain why the varying mask sizes have such an impact.

- **Task 2:**
 - Using Laplacian filter to sharpen image
 - Transform the image ([test03_b.jpg](#)) into gray scale
 - Then use a Laplacian filter mask to sharpen the image
(Laplacian filter values: `[[0 1 0], [1 -4 1], [0 1 0]]`)
 - You can also try other filter masks to see how they impact the outcome

Put the generated images in the report using Laplacian and other filters