

Assignment 1 Questions

Instructions

- 4 questions.
- Write code where appropriate.
- Feel free to include images or equations.
- Please make this document anonymous.
- This is to be submitted with all other material as part of a Jupyter notebook file.

Questions

Q1: Explicitly describe image convolution: the input, the transformation, and the output. Why is it useful for computer vision?

A1: Your answer here.

Q2: What is the difference between convolution and correlation? Construct a scenario which produces a different output between both operations.

Please use [scipy.ndimage.convolve](#) and [scipy.ndimage.correlate](#) to experiment!

A2: Your answer here.

Q3: What is the difference between a high pass filter and a low pass filter in how they are constructed, and what they do to the image? Please provide example kernels and output images.

A3: Your answer here.

Q4: How does computation time vary with filter sizes from 3×3 to 15×15 (for all odd and square sizes), and with image sizes from 0.25 MPix to 8 MPix (choose your own intervals)? Measure both using [*scipy.ndimage.convolve*](#) or [*scipy.ndimage.correlate*](#) to produce a matrix of values. Use the [*skimage.transform*](#) module to vary the size of an image. Use an appropriate charting function to plot your matrix of results, such as [*Axes3D.scatter*](#) or [*Axes3D.plot_surface*](#).

Do the results match your expectation given the number of multiply and add operations in convolution?

Image: [RISDance.jpg](#) (in the .tex directory).

A4: Your answer here.