Homework 2 Questions

Instructions

- 4 questions.
- Write code where appropriate.
- Feel free to include images or equations.
- **Please use only the space provided and keep the page breaks.** Please do not make new pages, nor remove pages. The document is a template to help grading.
- If you really need extra space, please use new pages at the end of the document and refer us to it in your answers.

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.

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 $cv2.filter2D()$ to produce a matrix of values. Use the $cv2.resize()$ function to vary the size of an image. Use an appropriate 3D charting function to plot your matrix of results, such as $plot\_surface()$ or $contour3D$.

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

See RISDance.jpg in the attached file.

A4: Your answer here.