HOMEWORK #3: LAPLACIAN IMAGE FILTER

ABEL GOMES

The Laplacian is a 2-D isotropic measure of the 2nd spatial derivative of an image. It is a sharpening operator because it highlights image regions of rapid intensity change and is therefore often used for edge detection.

Further Reading:

http://homepages.inf.ed.ac.uk/rbf/HIPR2/log.htm
http://en.wikipedia.org/wiki/Discrete_Laplace_operator
http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/Digi_Img_Pro/chapter_8/8_26.html
http://www.idlcoyote.com/ip_tips/sharpen.html
http://www.uoguelph.ca/~hydrogeo/Whitebox/Help/FilterLaplacian.html
http://www.bioss.ac.uk/people/chris/ch3.pdf

Exercise 1

After studying the concept of second derivative of a real function in two variables, let us:

- Explain why the Laplacian is an isotropic measure of the 2nd spatial derivative of an image.
- Derive the 2nd derivative of an image in the x-direction.
- Derive the 2nd derivative of an image in the y-direction.
- Calculate the Lapplacian.

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