**Edge Detection Lab**

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**Introduction:**

Edges contain some of the most useful information in an image. We may use edges to measure the size of objects in an image; to isolate particular objects from their background; to recognize or classify objects. There are a large number of edge-finding algorithms in existence, and we shall look at some of the more straightforward of them. The general Matlab command for finding edges is

edge(image,'method',parameters. . . )

where the parameters available depend on the method used. In this tutorial, we shall show how to

create edge images using basic filtering methods, and discuss the Matlab edge function.

**Q1: Enter the following matrix into MATLAB:**

Smallmatrix=[201 195 203 203 199 200 204 190 198 203;201 204 209 197 210 202 205 195 202 199;205 198 46 60 53 37 50 51 194 205;208 203 54 50 51 50 55 48 193 194;200 193 50 56 42 53 55 49 196 211;200 198 203 49 51 60 51 205 207 198;205 196 202 53 52 34 46 202 199 193;199 202 194 47 51 55 48 191 190 197;194 206 198 212 195 196 204 204 199 200; 201 189 203 200 191 196 207 203 193 204]

**use matlab image edge filtering method to apply each of the Roberts, Prewitt, Sobel, Laplacian, and zero-crossing edge-finding methods to that particular Smallmatrix image.**

**Also use imfilter to apply each of the Roberts, Prewitt, Sobel, Laplacian, and zero-crossing edge-finding methods to the image.**

**In the case of applying two filters (such as with Roberts, Prewitt, or Sobel) apply each filter separately, and join the results.**

**Q2: Open up the image cameraman.tif in Matlab, and apply each of the following edge \_finding**

**techniques in turn:**

(a) Roberts

(b) Prewitt

(c) Sobel

(d) Laplacian

(e) Zero-crossings of a Laplacian

Which seems to you to provide the best-looking result?

**Q3: Pick a grey-scale image, and add some noise to it; say with**

c=imread('cameraman.tif');

c1=imnoise(c,'salt & pepper',0.1);

c2=imnoise(c,'gaussian',0,0.02);

Now apply the edge \_finding techniques to each of the noisy images c1 and c2.

Which technique seems to give

(a) the best results in the presence of noise?

(b) the worst results in the presence of noise?

**Q4: You have MRI clean image given below:**



(i) First add noise using the following functions

(ii) check edge detection methods with noisy image

(iii) Clean the noisy image(use any spatial filtering method to denoise the image) and apply edge detection techniques on cleaned image obtained after noise removal.

img=imread(' MRI\_clean.tif');

c1noise=imnoise(img,'salt & pepper',0.1);

c2noise=imnoise(img,'gaussian',0,0.02);

c3noise=imnoise(img,'speckle', 0.1);