Computational Vision - Lab 2

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- Log on to the machine and open an xterm.
- Create a directory for vision lab 2, and change into it. Type 'matlab &' to start the programming environment.
- Start up a web browser and bring up the following URL, http://www.cs.bham.ac.uk/~dehghanh/vision.php
- Download the .m files and the data files (.gif) for Lab 2 and put them in the lab 2 directory.
- In Matlab type

  shakey = read_image('','shakey.150.gif');

  This will load up the .gif file from the current directory into the variable shakey. To see a help command for the function type

  help read_image
- You can display the image by typing

  show_image(shakey)

  This only works for grey images. Later I may extend it to work with colour ones.
- Now you can load up different sets of masks. To load up the sobel masks type

  load sobel

  If you now type

  Who

  you will get a list of variable names. You can see the sobel horizontal mask by typing

  sobelX

  and the array will print on screen.
- You can convolve the image with the mask by typing

  shakey_sobelX = conv2(shakey,sobelX,'valid');

  You can then display the new image.

- Apply both the sobelX and sobelY operators to the image. You can try to threshold the resulting images using

  show_image(abs(shakey_sobelX)>5)

  or whatever number you wish to use as the threshold.

- Depending on the mask you use for convolution you may need to apply the following function to the matrices that result from convolution:

  [x,y] = clip(shakey_sobelX,shakey_sobelY)

  This ensures that the matrices are the right size, and will match when you try to combine them. This shouldn't be necessary in this case, but will be useful with other masks later on.

- Combine the two resulting arrays using Pythagoras theorem. To do this you will need to write your own m-file. Call it magnitude.m. You can make it into a matlab function by typing

  function m = magnitude(x,y)

  at the top of your file. Now display the resulting image using

  show_image(m)

  You can also display this edge image after thresholding it,

  show_image(m>40)

  Create several of these with different thresholds. What do you notice?

- Now load up the Roberts operator. Repeat your previous exercise, but now you must write a combination routine that takes the absolute value of |Gx|+|Gy|. This is an approximation to the magnitude.

- Produce a written summary of the results of the Roberts and Sobel operators on the image. If you like download another image off the internet (greyscale) and do the same again. The images must be .gif files, to be loaded using read image. You can convert them from other formats in the Gimp (gimp &) or xv if you can't find .gif images you like. Alternatively if you have the Matlab GUI running, you can click on the file name for an image in any format (e.g. .jpg) in the directory frame to the left of the main frame. This will generate a dialogue box that will ask you if you want to load it and create a variable (to hold its contents) of the same name. Click <finish> in the dialogue box, and you've loaded it. You can do this with the file cluttera1.jpg from the webpage.

- Remember to submit you short write-up by next Friday 12.00 in the box outside reception.