DIGITAL IMAGE FUNDAMENTALS

Lab Objectives

This objective of this lab is to understand

1. How to read an image in Matlab.
2. How to show an image in Matlab.
3. How to access Image Pixels in Matlab.
4. How to write Image in Matlab.
5. Mirror Image generation.
6. Flipped Image generation.

Reading an Image

To import an image from any supported graphics image file format, in any of the supported bit depths, use the imread function.

Syntax
A = imread(filename,fmt)

Description

A = imread(filename,fmt) reads a greyscale or color image from the file specified by the string filename, where the string fmt specifies the format of the file. If the file is not in the current directory or in a directory in the MATLAB path, specify the full pathname of the location on your system.

Accessing the Pixel data

There is a one-to-one correspondence between pixel coordinates and the coordinates MATLAB® uses for matrix subscripting. This correspondence makes the relationship between an image's data matrix and the way the image is displayed easy to understand. For example, the data for the pixel in the fifth row, second column is stored in the matrix element (5,2). You use normal MATLAB matrix subscripting to access values of individual pixels. For example, the MATLAB Code

A(2,15);

Returns the value of the pixel at row 2, column 15 of the image A.

Display an Image

To display image, use the imshow function.

Syntax
imshow(A)
Description
Imshow(A) displays the image stored in array A.

How to get no. of rows and columns of image

Function **size** gives the rows and columns dimension of image

```
[r,c]=size(a)
r =
        512
c =
        512
```

Writing Image Data

Imwrite
Write image to graphics file

Syntax
imwrite(A,filename,fmt)

Example:

```
a=imread('pout.tif');
imwrite(a,gray(256),'b.bmp');
```

Labwork:

a) Read a grayscale image and display it using function imshow(a).
b) Read a grayscale image and display its intensity level in different pixels.
c) Display the intensity of pixel in position (20,0) (511,511),(0,0) and relate it with picture (conclusion must be in lab report)
d) Create an array of size 512 x 512 and assign values 1-512 to elements of rows. Then display it.:

```
for i = 1:1:255
    for j = 1:1:255
        a(i,j) = j;
    end
end
```

1) Display image created in d by a using function imshow(a).
2) Display image created in d by a using function imshow(a,[0 255]);

3) Display image created in d by a using following code.

```
Colormap(gray(256));
Imshow(a);
```

e) Read a grayscale image and mirror it.
f) Read a grayscale image and flip it.
g) Observe the difference

```
for i = 1:1:255
    for j = 1:1:255
        a(i,j) = j;
    end
end
imwrite(a,'d:\first.bmp')
imwrite(a,gray(256),'d:\second.bmp');
```

Differentiate first and second image