Bangladesh Army University of Engineering & Technology (BAUET)

Department of Computer Science & Engineering (CSE)

DIGITAL IMAGE

PROCESSING

LAB MANUAL 1

Introduction to Digital Image Processing

Using Matlab

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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.
7. Negative 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 grayscale 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.

Display An Image

To display image, use the imshow function.

Syntax

imshow(A)

Description

imshow(A) displays the image stored in array A.

Title an Image

To add a title of an image, use the title function.

Syntax

title('text')

Description

title('text') displays the image title top of the image. The title will be the given text.
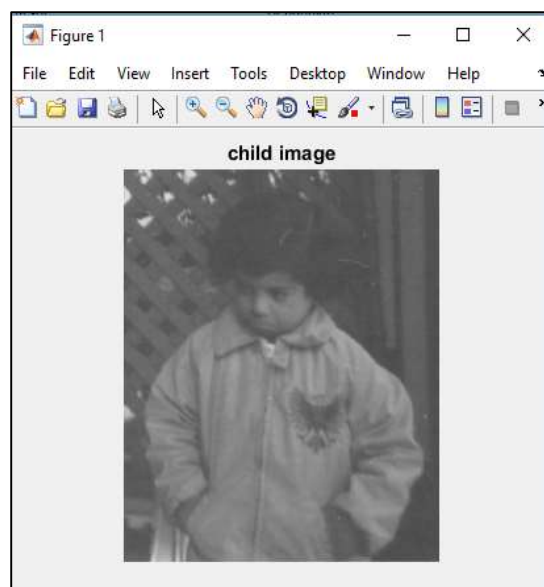
Writing Image Data

Write image to graphics file, use imwrite function

Syntax

imwrite(A,'filename,fmt')

Example:

a=imread('pout.tif');

imwrite(a,'b.bmp');

imshow('b.bmp')% imshow is used to display image

title('child image');

Writing Image to Disk

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 =

     291

c =

     240

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.

MIRROR IMAGE GENERATION
% this program produces mirror image of the image passed to it and
% also displays both the original and mirror image

Algorithm	Matlab Code

1. Read an image.
 	
2. Start with first row of input image.
 	
3. Traverse all column of a row from last to first and store each value in another matrix from first to last.
 	
4. Then go to next column of input image.
 	
5. Repeat 3,4 until last row of input image visit.
	a=imread('pout.tif');
	[r,c]=size(a);
	for i=1:1:r
	    k=1;
	    for j=c:-1:1
	        result(i,k)=a(i,j);
	        k=k+1;
	    end
	end
	subplot(1,2,1),imshow(a)
	subplot(1,2,2),imshow(result)

Source Image and resultant One

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TASK 1

Write a MATLAB code that reads a gray scale image and generates the flipped image of original image. Your output should be like the one given below-

Source Image with Desired Output

TASK 2

Write a MATLAB code that will do the following

1. Read any gray scale image.
2. Display that image.
3. Again display the image such that the pixels having intensity values below than 50 will display as black and pixels having intensity values above than 150 will display as white. And the pixels between these will display as it is.

TASK 3

Write a MATLAB code that reads a gray scale image and generates the negative image of original image. Your output should be like the one given below.

TASK 4

Write the syntax and purpose of use of some MATLAB standard functions-
1. imtool
2. who/whos
3. imfinfo
4. imcomplement
5. flip