



MATLAB

IMAGE

Session 5

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What is Image

- In Matlab, an image is a set of color or intensity data.
- Each image is formed by combination of pixels.
- Each pixel is a matrix element.
- Each pixel has its own intensity of red, blue and green color.
- A high level image is represented by a 3 dimensional array.
- First plane in the third dimension represents the red pixel intensities, the second plane represents the green pixel intensities, and the third plane represents the blue pixel intensities.

Popular Matlab functions associated with Images:

In Matlab, there are a lot of useful functions. Some of these are:

- imread
- imshow
- rgb2gray
- imhist
- imb2w

And many more....

Loading an image in Matlab:

For loading an image in Matlab, we use "imread" function.

Following is an example of loading an image:

```
a=imread('skardu.jpeg');
```

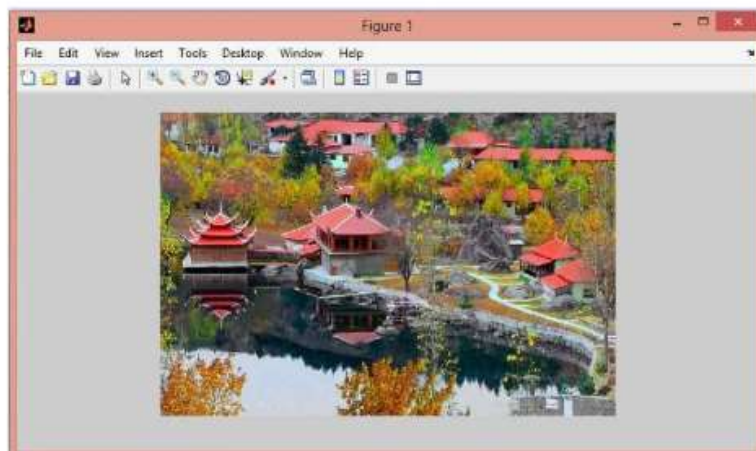
Showing an image in Matlab:

. "imshow" function shows the loaded image in Matlab window.

Following is an example:

```
a=imread('skardu.jpg');  
imshow(a);
```

Output:



Types of images:

- **Binary Images**

Binary images are made of only two colors: Black and White



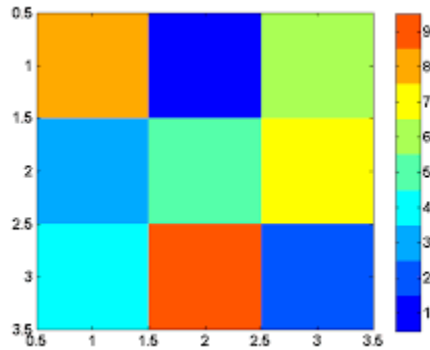
- **Grayscale Images**

A grayscale image is a data matrix whose values represent intensities within some range.



- **Indexed images**

In an Indexed Image, the color of each image pixel is determined by using the Corresponding value of X as an index into map.



- **RGB Image**

An RGB image is stored as an $m*n*3$ data array that defines red, green, and blue color components for each individual pixel.



Example:

the color red ,It is extracted from a three-dimensional array, it contains the value of the red color, whose value ranges in the field [0.1], the black color has a value of 0, the red color has a value of 1, and what is in between are the degrees of red, as well as for the rest of the colors.

Domain types:

Double: In the range [0,1] black gets 0, desired color gets 1 and numbers between 0 and 1 are shades like 0.521.

Unit8: Its range is [0:255], black is represented by the number 0, and the color is represented by the number 255, and between shades of color. This type is preferred to reduce memory space and speed up image processing.

Converting

Matalb offers many useful commands to convert images form one form to another:

- **Demosaic** Convert Bayer pattern encoded image to truecolor (RGB) image.
- **Dither** Use dithering to convert a grayscale image to a binary image or to convert a truecolor image to an indexed image.
- **Gray2ind** Convert a grayscale image to an indexed image.
- **Grayscale** Convert a grayscale image to an indexed image by using multilevel thresholding.
- **Im2bw** Convert a grayscale image, indexed image, or truecolor image, to a binary image, based on a luminance threshold.

- **Ind2gray** Convert an indexed image to a grayscale image.
- **Ind2rgb** Convert an indexed image to a truecolor image.

Open, read and display its image:-

1- open an image

To open an image from the computer, use the command

```
X=imread (filename,format);
```

```
Imshow(x);
```

This command means reading the image from the path filename and its extension formate and storing it in the x array.

2- Write an image

To save or print the image on the device with a new name and extension we use

```
Imwrite(image,filename)
```