



HINDU COLLEGE, GUNTUR – 522 003

(Re-accredited by NAAC as Grade 'A' with CGPA 3.07)

Main Road, Opp. Sri Venkateswara Vignam Mandir, Guntur

DEPARTMENT OF MATHEMATICS

DR. S.V.S. GIRIJA, Professor of Mathematics

Y. SREEKANTH, Lecturer in Mathematics

STUDENT CENTRIC ACTIVITIES – 2021-22

INCREDIBLE IMAGES WITH MATLAB

Problem Solving Session 2

Problem	: INCREDIBLE IMAGES WITH MATLAB
Date and Time	: 10-08-2022 10.30 to 12.30
Venue	: B1 GALLERY HALL
Co-ordinator	: Dr. S.V.S. Girija
No.of Staff Members Involved: One (Y. Sreekanth)	
No.of Students Involved	: 45 III B.Sc. MPC , MPCs, MSCs
Objective of the event	: To make students well versed with new concepts and solving problems
Plan and Execution	: Problem is given to the Students to demonstrate the built in functions and mechanism behind Image Processing through MATLAB
Outcome of the Event	: Students studied the concepts and explained in such a way that everyone is able to understand the mathematical concepts and transformations employed on images for enhancement of shades. They executed programs in MATLAB and demonstrated with live photos.
Evidences	: Material and Pictures



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MATLAB stands for Matrix Laboratory. It is a high-performance language that is used for technical computing. It was developed by Cleve Moler of the company MathWorks, Inc in the year 1984. It is written in C, C++, Java. It allows matrix manipulations, plotting of functions, implementation of algorithms, and creation of user interfaces.

In this article, we are going to discuss how to read images using MATLAB.

In-order to read images we are going to use the *imread()* function in MATLAB. The *imread()* function reads images from the graphics files.

`A = imread(filename)` reads the image from the file specified by filename, inferring the format of the file from its contents. If filename is a multi-image file, then imread reads the first image in the file.

Working with Image Formats

In its native form, a graphics file format image is not stored as a MATLAB[®] matrix, or even necessarily as a matrix. Most graphics files begin with a header containing format-specific information tags, and continue with bitmap data that can be read as a continuous stream. For this reason, you cannot use the standard MATLAB I/O commands `load` and `save` to read and write a graphics file format image.

Call special MATLAB functions to read and write image data from graphics file formats:

- To read a graphics file format image use `imread`.
- To write a graphics file format image, use `imwrite`.
- To obtain information about the nature of a graphics file format image, use `imfinfo`.

This table gives a clearer picture of which MATLAB commands should be used with which image types.



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Description. `A = imread( filename )` reads the image from the file specified by filename , inferring the format of the file from its contents. If filename is a multi-image file, then imread reads the first image in the file.

% reading image

```
A = imread('g4g.jpg');
```

% displaying image

```
imshow(A);
```

Reading a Graphics Image

The `imread` function reads an image from any supported graphics image file in any of the supported bit depths. Most of the images that you read are 8-bit. When these are read into memory, they are stored as class `uint8`. The main exception to this rule is MATLAB support for 16-bit data for PNG and TIFF images; if you read a 16-bit PNG or TIFF image, it is stored as class `uint16`.

```
A = imread('ngc6543a.jpg');
```

`imread` returns a 650-by-600-by-3 array, `A`.

Display the image.

Name of graphics file, specified as a character vector or string scalar.

Depending on the location of your file, filename can take on one of these forms.

Location	Form
Current folder or folder on the MATLAB® path	Specify the name of the file in filename. Example: 'myImage.jpg'
File in a folder	If the file is not in the current folder or in a folder on the MATLAB path,



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Location	Form
	then specify the full or relative path name. Example: 'C:\myFolder\myImage.ext' Example: 'imgDir\myImage.ext'
URL	If the file is located by an internet URL, then filename must contain the protocol type Example: 'http://hostname/path_to_file/my_image.jpg'
Remote Location	If the file is stored at a remote location, then filename must contain the full path of the specified as a uniform resource locator (URL) of the form: <i>scheme_name://path_to_file/my_file.ext</i> Based on the remote location, <i>scheme_name</i> can be one of the values in this table.

PIXELS IN IMAGE

Black and White image

- Images are stored in the form of a matrix of numbers in a computer where these numbers are known as pixel values.
- These pixel values represent the intensity of each pixel.
- 0 represents black and 255 represents white.

Colour Image

The intensity of a pixel, usually an integer. For grayscale images, the pixel value is typically an 8-bit data value (with a range of 0 to 255) or a 16-bit data value (with a range of 0 to 65535). For color images, there are **8-bit, 16-bit, 24-bit, and 30-bit colors**.

In a colored image the number of matrices or the number of channels will be more. In this particular example, we have 3 matrices-



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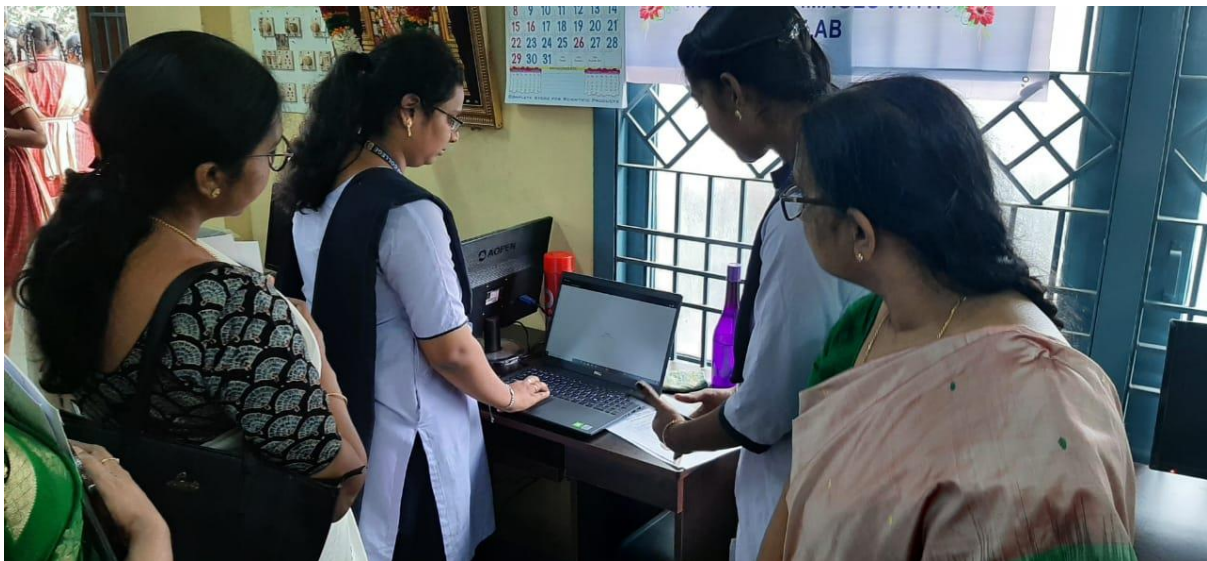
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Each of these metrics would again have values ranging from 0 to 255 where each of these numbers represents the intensity of the pixels or you can say that the shades of red, green, and blue. Finally, all of these channels or all of these matrices are superimposed so the shape of the image, when loaded in a computer, will be-

$N \times M \times 3$

where N is the number of pixels across the height, M would be the number of pixels across the width, and 3 is representing the number of channels, in this case, we have 3 channels R, G, and B. In our example, the shape of the colored image would be- $6 \times 5 \times 3$ since we have 6 pixels across the height, 5 across the width and there are 3 channels present.



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