

# Image Processing for Beginners using MATLAB

by Pravin Barmashe(BE, M.Tech, PhD.\*)

## Trainer's Experience

*I am providing training on MATLAB for 12 years to research scholars of ME/MTech and PhDs. I have worked on various research domains like wireless signal processing, wireless network designing, sensor network designs, face recognition, character recognition, handwriting recognition using AI, Artificial Neural Network, Machine Learning etc. on MATLAB platform. After completion of the course you will be able to write program for solving numerical problems and processing signals and images.*

## Course Syllabus

### About the course

This course covers handling and processing of fundamental operations on Image in MATLAB. This course includes different operations on image, image reading, writing and editing, color space conversions, color to grayscale, monochrome, image histograms, image filtering, Thresholding in image, Edge detection in MATLAB, Morphology, Labelling GUI handling.

### 1. Introduction to MATLAB

- 1.1. How to Run MATLAB
- 1.2. MATLAB User Interface
- 1.3. Comments, line terminator
- 1.4. file types .m, .mat, .fig etc.

### 2. Basics of Image

- 2.1. Types of Image(Color, Grayscale, Binary)
- 2.2. Raster and Vector Image
- 2.3. Layers or Channels
- 2.4. Color Spaces
- 2.5. Pixel Region
- 2.6. Saving an Image

### 3. Image Operations in MATLAB

- 3.1. Reading of an Image and It's Pixels
- 3.2. Image Conversions
- 3.3. Mean and Sum of Images
- 3.4. Saving an Image

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## 4. Histogram of Images

- 4.1. Grayscale Image histogram
- 4.2. Color Image Histogram
- 4.3. Histogram Equalization
- 4.4. Adaptive Histogram Equalization

## 5. Image Filtering

- 5.1. Average Filtering
- 5.2. Image Median Filtering
- 5.3. Weiner Filtering
- 5.4. Gaussian Filtering
- 5.5. Add Noising to Image

## 6. Edge Detection and Thresholding

- 6.1. Image Thresholding
- 6.2. Different Edge Detection
- 6.3. Image Sharpening

## 7. Image Morphology

- 7.1. Image Erosion
- 7.2. Dialation Operation
- 7.3. Opening and Closing on Image