



itie Knowledge Solutions

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CEML03: Image processing with MATLAB (2-days)

This training is all about how MATLAB Image Processing toolbox can be used for image processing, analysis, visualization, and algorithm development. The training covers various topics such as importing and exporting images, pre- and post-processing of images, analysis and visualization of images, and spatial transformations and image registration.

Day 1 of 2

Introduction

- A quick overview of MATLAB computing environment
- Overview of MATLAB Image Processing toolbox
- Course content and material discussion

Acquiring and handling images in MATLAB

- Connecting the hardware
- Retrieving hardware information
- Acquiring and viewing the image data
- Image file I/O
- Exploring image types
- RGB, binary, intensity, and indexed images
- Image type conversions
- The concept of color space and image color space conversions
- Finding pixel value information
- Computing mean and standard deviation of images
- Measuring properties of image regions

Image enhancement techniques

- Adjusting image intensity
- Image histogram operations: adjustment, equalization, and stretching
- multidimensional arrays
- Image arithmetic operations
- Cropping and resizing images
- Image alignment correction: rotating images

Image filtering

- Neighborhood and block processing of images
- Distinct block operations
- Sliding neighborhood operations
- Performing image convolution and correlation
- Averaging filters
- Region of interest processing
- Introduction to spatial and frequency domain filtering

Day 2 of 2

Image restoration techniques

- Reducing noise from images
- Deblurring images
- Correcting background illumination

Edge detection related operations

- Edges in an image
- Detecting edges with various methods: Sobel, Prewitt, Roberts, Laplacian of Gaussian, zero cross and Canny.
- Computing edge directive histogram

Image morphological operations

- Bridging unconnected pixels, cleaning, closing, and opening
- Dilation and erosion
- Identifying and labeling connected components

Image transforms

- Forward and inverse Discrete cosine transform
- Forward and inverse Fast Fourier transform
- Forward and inverse Radon transform
- Applying wavelet transform to images