itie
knowledge solutions

Bio-Medical Image processing with MATLAB® (25 hours + 15 hours)

This training is all about how MATLAB® Image Processing toolbox can be used for Bio-Medical 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.

COURSE CONTENT :	
Introduction **(1 hour)**	• A quick overview of MATLAB® computing environment • Overview of MATLAB® Image Processing toolbox • Course content and material discussion
Acquiring and handling images in MATLAB® **(6 hours)**	• 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 **(4 hours)**	• 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 **(5 hours)**	• 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

Image restoration techniques (2 hours)	• Reducing noise from images • De-blurring images • Correcting background illumination
Edge detection related operations (2 hours)	• 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 (2 hour)	• Bridging unconnected pixels, cleaning, closing, and opening • Dilation and erosion • Identifying and labeling connected components
Image transforms (3 hours)	• Forward and inverse Discrete cosine transform • Forward and inverse Fast Fourier transform • Forward and inverse Radon transform • Applying wavelet transform to images
Bio-Medical Image Processing (15 hours)	• Introduction to Bio-Medical Image Processing • Overview of different imaging modalities • Medical Image Enhancement • Medical Image filtering • Medical Image segmentation