

Image Processing with MATLAB

Prerequisites

MATLAB Fundamentals or equivalent experience using MATLAB. Basic knowledge of image processing concepts is strongly recommended.

Day 1 of 2	
Importing and Visualizing Images	<p>Objective: Import images into MATLAB and visualize them. Convert the images to a format that is useful for subsequent analysis steps.</p> <ul style="list-style-type: none">Importing and displaying imagesConverting between image typesExporting images
Preprocessing Images	<p>Objective: Preprocess images by filtering, and using contrast adjustment to simplify or allow for image analysis steps.</p> <ul style="list-style-type: none">Adjusting image contrastReducing noise in an image by filteringHandling inhomogenous backgroundApplying custom functions block by block
Spatial Transformation and Image Registration	<p>Objective: Compare images with different scaling and orientation by aligning them.</p> <ul style="list-style-type: none">Geometric transformationsImage registration using point mappingImage registration using phase correlation
Automating Image Registration with Image Features	<p>Objective: Detect, extract, and match sets of image features to automate image registration.</p> <ul style="list-style-type: none">Detecting and extracting featuresMatching featuresEstimating geometric transformations between images

Day 2 of 2	
Edge and Line Detection	<p>Objective: Segment edges of objects and extract boundary pixel locations. Detect lines and circles in an image.</p> <ul style="list-style-type: none">Segmenting object edgesDetecting straight linesPerforming batch analysis over sets of imagesDetecting circular objects

Color and Texture Segmentation	<p>Objective: Segment objects based on color or texture. Use texture features for image classification.</p> <ul style="list-style-type: none">Color space transformationColor segmentationTexture segmentationTexture-based image classification
Feature Extraction	<p>Objective: Analyze and modify the objects' shape to improve segmentation results. Count the detected objects and calculate object features like area or centroids.</p> <ul style="list-style-type: none">Counting objectsMeasuring shape propertiesUsing morphological operationsPerforming watershed segmentation