

Image Processing Toolbox.
Version 3.2 (R13) 28-Jun-2002

Release information.

images/Readme - Display information about current and previous versions.

Image display.

colorbar - Display colorbar (MATLAB Toolbox).
getimage - Get image data from axes.
image - Create and display image object (MATLAB Toolbox).
imagesc - Scale data and display as image (MATLAB Toolbox).
immovie - Make movie from multiframe image.
imshow - Display image.
montage - Display multiple image frames as rectangular montage.
movie - Play recorded movie frames (MATLAB Toolbox).
subplot - Display multiple images in single figure.
truecolor - Adjust display size of image.
warped - Display image as texture-mapped surface.

Image file I/O.

dicominfo - Read metadata from a DICOM message.
dicomread - Read a DICOM image.
dicomwrite - Write a DICOM image.
dicomdict.txt - Text file containing DICOM data dictionary.
imfinfo - Return information about image file (MATLAB Toolbox).
imread - Read image file (MATLAB Toolbox).
imwrite - Write image file (MATLAB Toolbox).

Image arithmetic.

imabsdiff - Compute absolute difference of two images.
imadd - Add two images, or add constant to image.
imcomplement - Complement image.
imdivide - Divide two images, or divide image by constant.
imlincomb - Compute linear combination of images.
immultiply - Multiply two images, or multiply image by constant.
imsubtract - Subtract two images, or subtract constant from image.

Geometric transformations.

checkerboard - Create checkerboard image.
findbounds - Find output bounds for geometric transformation.
fliptform - Flip the input and output roles of a TFORM struct.
imcrop - Crop image.
imresize - Resize image.
imrotate - Rotate image.
imtransform - Apply geometric transformation to image.
makesampler - Create resampler structure.

maketform - Create geometric transformation structure (TFORM).
tformarray - Apply geometric transformation to N-D array.
tformfwd - Apply forward geometric transformation.
tforminv - Apply inverse geometric transformation.

Image registration.

cpstruct2pairs - Convert CPSTRUCT to valid pairs of control points.
cp2tform - Infer geometric transformation from control point pairs.
cpcorr - Tune control point locations using cross-correlation.
cpselect - Control point selection tool.
normxcorr2 - Normalized two-dimensional cross-correlation.

Pixel values and statistics.

corr2 - Compute 2-D correlation coefficient.
imcontour - Create contour plot of image data.
imhist - Display histogram of image data.
impixel - Determine pixel color values.
improfile - Compute pixel-value cross-sections along line segments.
mean2 - Compute mean of matrix elements.
pixval - Display information about image pixels.
regionprops - Measure properties of image regions.
std2 - Compute standard deviation of matrix elements.

Image analysis.

edge - Find edges in intensity image.
qtdecomp - Perform quadtree decomposition.
qtgetblk - Get block values in quadtree decomposition.
qtsetblk - Set block values in quadtree decomposition.

Image enhancement.

histeq - Enhance contrast using histogram equalization.
imadjust - Adjust image intensity values or colormap.
imnoise - Add noise to an image.
medfilt2 - Perform 2-D median filtering.
ordfilt2 - Perform 2-D order-statistic filtering.
stretchlim - Find limits to contrast stretch an image.
wiener2 - Perform 2-D adaptive noise-removal filtering.

Linear filtering.

convmtx2 - Compute 2-D convolution matrix.
fspecial - Create predefined filters.
imfilter - Filter 2-D and N-D images.

Linear 2-D filter design.

freqspace - Determine 2-D frequency response spacing (MATLAB Toolbox).
freqz2 - Compute 2-D frequency response.

fsamp2 - Design 2-D FIR filter using frequency sampling.
 ftrans2 - Design 2-D FIR filter using frequency transformation.
 fwind1 - Design 2-D FIR filter using 1-D window method.
 fwind2 - Design 2-D FIR filter using 2-D window method.

Image deblurring.

deconvblind - Deblur image using blind deconvolution.
 deconvlucy - Deblur image using Lucy-Richardson method.
 deconvreg - Deblur image using regularized filter.
 deconvwnr - Deblur image using Wiener filter.
 edgetaper - Taper edges using point-spread function.
 otf2psf - Optical transfer function to point-spread function.
 psf2otf - Point-spread function to optical transfer function.

Image transforms.

dct2 - 2-D discrete cosine transform.
 dctmtx - Discrete cosine transform matrix.
 fft2 - 2-D fast Fourier transform (MATLAB Toolbox).
 fftn - N-D fast Fourier transform (MATLAB Toolbox).
 fftshift - Reverse quadrants of output of FFT (MATLAB Toolbox).
 idct2 - 2-D inverse discrete cosine transform.
 ifft2 - 2-D inverse fast Fourier transform (MATLAB Toolbox).
 ifftn - N-D inverse fast Fourier transform (MATLAB Toolbox).
 iradon - Compute inverse Radon transform.
 phantom - Generate a head phantom image.
 radon - Compute Radon transform.

Neighborhood and block processing.

bestblk - Choose block size for block processing.
 blkproc - Implement distinct block processing for image.
 col2im - Rearrange matrix columns into blocks.
 colfilt - Columnwise neighborhood operations.
 im2col - Rearrange image blocks into columns.
 nlfilt - Perform general sliding-neighborhood operations.

Morphological operations (intensity and binary images).

conndef - Default connectivity.
 imbothat - Perform bottom-hat filtering.
 imclearborder - Suppress light structures connected to image border.
 imclose - Close image.
 imdilate - Dilate image.
 imerode - Erode image.
 imextendedmax - Extended-maxima transform.
 imextendedmin - Extended-minima transform.
 imfill - Fill image regions and holes.
 inhmax - H-maxima transform.

inhmin - H-minima transform.
 imimposemin - Impose minima.
 imopen - Open image.
 imreconstruct - Morphological reconstruction.
 imregionalmax - Regional maxima.
 imregionalmin - Regional minima.
 imtophat - Perform tophat filtering.
 watershed - Watershed transform.

Morphological operations (binary images)

applylut - Perform neighborhood operations using lookup tables.
 bwarea - Compute area of objects in binary image.
 bwareaopen - Binary area open (remove small objects).
 bwdist - Compute distance transform of binary image.
 bweuler - Compute Euler number of binary image.
 bwhitmiss - Binary hit-miss operation.
 bwlabel - Label connected components in 2-D binary image.
 bwlabeln - Label connected components in N-D binary image.
 bwmorph - Perform morphological operations on binary image.
 bwpack - Pack binary image.
 bwperim - Determine perimeter of objects in binary image.
 bwselect - Select objects in binary image.
 bwulterode - Ultimate erosion.
 bwunpack - Unpack binary image.
 makelut - Construct lookup table for use with applylut.

Structuring element (STREL) creation and manipulation.

getheight - Get strel height.
 getneighbors - Get offset location and height of strel neighbors
 getnhood - Get strel neighborhood.
 getsequence - Get sequence of decomposed strels.
 isflat - Return true for flat strels.
 reflect - Reflect strel about its center.
 strel - Create morphological structuring element.
 translate - Translate strel.

Region-based processing.

roicolor - Select region of interest, based on color.
 roifill - Smoothly interpolate within arbitrary region.
 roifilt2 - Filter a region of interest.
 roipoly - Select polygonal region of interest.

Colormap manipulation.

brighten - Brighten or darken colormap (MATLAB Toolbox).
 cmpermute - Rearrange colors in colormap.
 cmunique - Find unique colormap colors and corresponding image.

`colormap` - Set or get color lookup table (MATLAB Toolbox).
`imapprox` - Approximate indexed image by one with fewer colors.
`rgbplot` - Plot RGB colormap components (MATLAB Toolbox).

Color space conversions.

`hsv2rgb` - Convert HSV values to RGB color space (MATLAB Toolbox).
`ntsc2rgb` - Convert NTSC values to RGB color space.
`rgb2hsv` - Convert RGB values to HSV color space (MATLAB Toolbox).
`rgb2ntsc` - Convert RGB values to NTSC color space.
`rgb2ycbcr` - Convert RGB values to YCBCR color space.
`ycbcr2rgb` - Convert YCBCR values to RGB color space.

Array operations.

`circshift` - Shift array circularly. (MATLAB Toolbox).
`padarray` - Pad array.

Image types and type conversions.

`dither` - Convert image using dithering.
`gray2ind` - Convert intensity image to indexed image.
`grayslice` - Create indexed image from intensity image by thresholding.
`graythresh` - Compute global image threshold using Otsu's method.
`im2bw` - Convert image to binary image by thresholding.
`im2double` - Convert image array to double precision.
`im2java` - Convert image to Java image (MATLAB Toolbox).
`im2uint8` - Convert image array to 8-bit unsigned integers.
`im2uint16` - Convert image array to 16-bit unsigned integers.
`ind2gray` - Convert indexed image to intensity image.
`ind2rgb` - Convert indexed image to RGB image (MATLAB Toolbox).
`isbw` - Return true for binary image.
`isgray` - Return true for intensity image.
`isind` - Return true for indexed image.
`isrgb` - Return true for RGB image.
`label2rgb` - Convert label matrix to RGB image.
`mat2gray` - Convert matrix to intensity image.
`rgb2gray` - Convert RGB image or colormap to grayscale.
`rgb2ind` - Convert RGB image to indexed image.

Toolbox preferences.

`iptgetpref` - Get value of Image Processing Toolbox preference.
`iptsetpref` - Set value of Image Processing Toolbox preference.

Demos.

`dctdemo` - 2-D DCT image compression demo.
`edgedemo` - Edge detection demo.
`firdemo` - 2-D FIR filtering and filter design demo.
`imadjdemo` - Intensity adjustment and histogram equalization demo.

landsatdemo - Landsat color composite demo.
nrfiltdemo - Noise reduction filtering demo.
qtdemo - Quadtree decomposition demo.
roidemo - Region-of-interest processing demo.

Slide shows.

ipss001 - Region labeling of steel grains.
ipss002 - Feature-based logic.
ipss003 - Correction of nonuniform illumination.

Extended-examples.

ipexindex - Index of extended examples.
ipexsegmicro - Segmentation to detect microstructures.
ipexsegcell - Segmentation to detect cells.
ipexsegwatershed - Watershed segmentation.
ipexgranulometry - Granulometry of stars.
ipexdeconvwnr - Wiener deblurring.
ipexdeconvreg - Regularized deblurring.
ipexdeconvlucy - Lucy-Richardson deblurring.
ipexdeconvblind - Blind deblurring.
ipextform - Image transform gallery.
ipexshear - Image padding and shearing.
ipexmri - 3-D MRI slices.
ipexconformal - Conformal mapping.
ipexnormxcorr2 - Normalized cross-correlation.
ipexrotate - Rotation and scale recovery.
ipexregaerial - Aerial photo registration.